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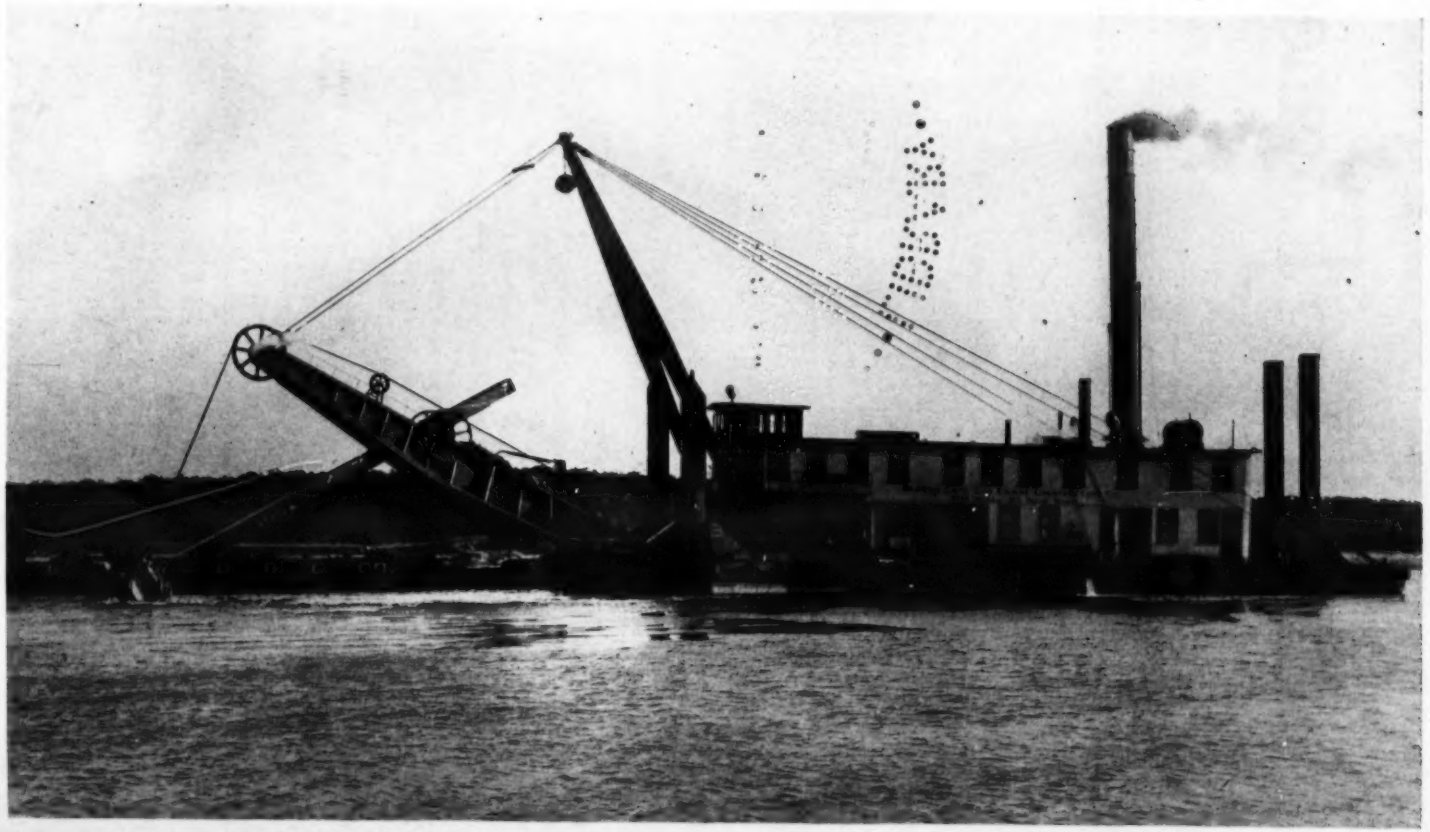


10 Yard Atlantic Type Dipper Dredge "Governor Warfield", at Work on the Cape Cod Canal, near Bourne, Mass.

Construction Work on the Cape Cod Canal

IN the year 1776 George Washington ordered a route to be surveyed for a passage across Cape Cod from Barnstable Bay to Monument Bay in order "to give greater security to navigation and against the enemy". One hundred and thirty eight years later, in December 1914, this canal, according to latest assurances, will be completed. No engineering project in the Uuited States has had a longer or a more varied history and yet it is but an eight mile waterway through the sand hills of the Massachusetts Coast!

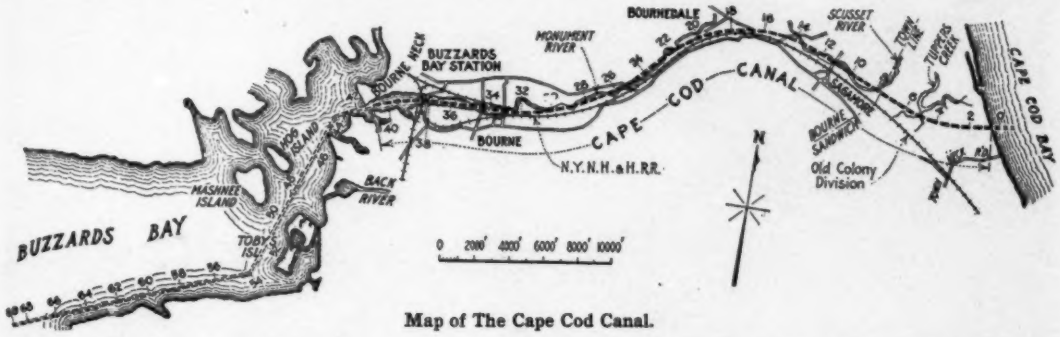
The crying human need for such a canal can well be understood from the incomplete records available, which show that between 1843 and 1893, 2131 vessels were wrecked on their way around Cape Cod, 908 were a complete loss and ten entire crews went down.

For a hundred years survey after survey were made without further progress. In 1880 work was started and abandoned. Three years later a million yards were dug and the company failed. Finally on June 2nd, 1909 Mr. August Belmont under happier auspices, began the work which is now fast approaching completion.

The coast line of Massachusetts is too well known to necessitate description; suffice it to say that Cape Cod is a hook shaped peninsula projecting about 30 miles eastward from the Massachusetts Coast into the Atlantic. It has the appearance of an arm bent at the elbow with the fist clenched. Outside this hook or fist, dangerous shoals menace coastwise shipping. The canal cuts off this hook from the mainland, or, to continue our metaphor, amputates the arm at the shoulder, and saves 66 miles over the Vineyard Sound route from Boston to New York and 144 miles via the Nantucket Lightship route. The actual time saved coasting vessels will be in much greater proportion during rough weather, as the delays now necessary on this account will be avoided. The saving in insurance for vessels using the canal will also be considerable.

It will be a sea-level channel, 30 feet deep, larger in dimensions than the original Suez Canal and capable of accommodating all the coast commercial ships.

On the south side of the peninsula, at the base of the hook, is Buzzards Bay, which is almost land locked and forms an expansive and magnificent harbor. From Buzzards Bay the passage into Long Island Sound is easy and can be made in all kinds of weather without danger. A canal through the base of the hooked peninsula, from Barnstable to Buzzards Bay, will therefore make possible an inland waterway from Boston, Mass., to New York City and points south, except for the short but exposed stretch of open water between Boston and the Barnstable Bay entrance of the canal.



Map of The Cape Cod Canal.

The country through which the canal prism passes, from the low salt marshes west of the town of Sandwich to the Scussett River, across a low dividing ridge and down the valley of the Monument River to deep water in Buzzards Bay, is a most remarkable physical formation. It has every appearance that nature had intended a waterway or that at some previous time a channel had existed here.

The valley of the Monument River is low and broad and is of an alluvial formation, consisting of sand and gravel mixed with large and small boulders.

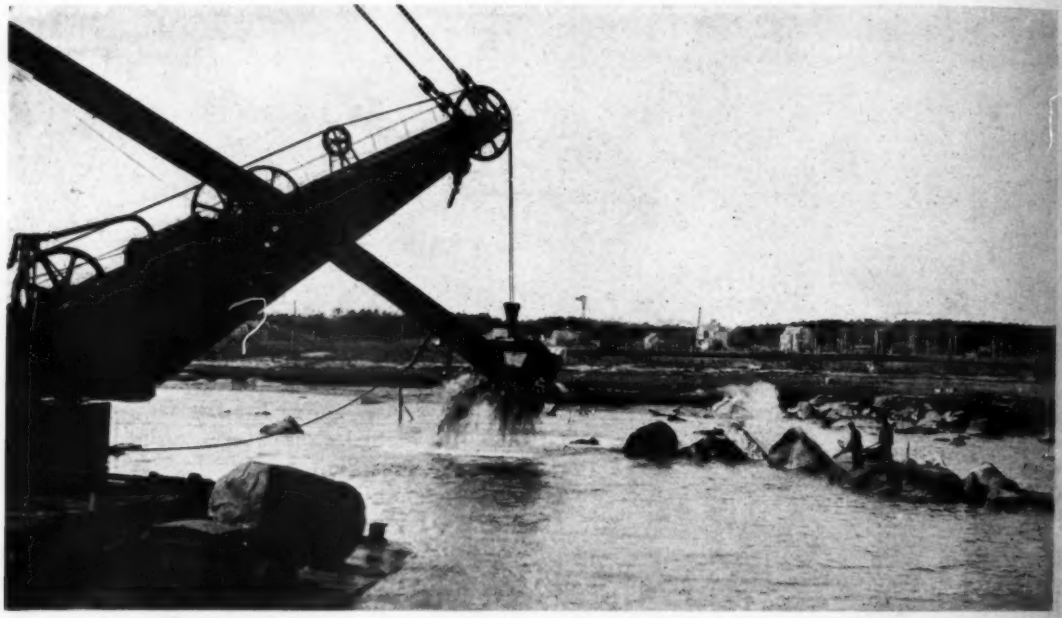
The ridge dividing the headwaters of the two rivers is only three-quarters of a mile wide and but 29 ft. above mean sea level. The width of the valley is about 650 ft. at its narrowest point and expands gradually toward each end. The hills rise on either side of the valley in gradual slopes to heights of from 60 to 180 ft.

Except for the narrow dividing ridge, the canal prism excavation has required the removal of but little material except between the high-water level and the bottom of the canal. There is no physical obstacle to a canal as deep as may be desired, and the width may be made at least 600 ft. The material excavated is chiefly sand, and boulders with underlying strata of hardpan in some places. Through the salt marshes at the eastern end the material is of a peaty nature, but not difficult to dredge. The boulders are too few to offer any serious trouble to the dipper dredges and shovels, although the hydraulic dredge "Sagamore" in the early stages of work was seriously delayed by this cause.

the cutting reaches a depth of over 50 feet. The average cutting is between thirty and forty feet. The total excavation is estimated at about 16,000,000 yards. The rip rap work on the slopes of the canal will require about 200,000 tons of stone and the breakwater about 400,000.

Active operations were started in the latter part of June 1909.

Construction of the break-water at the east end was carried on throughout the summer, and nearly 50,000 tons of granite placed in it, or about one-eighth of the total. This work was delayed at times by severe weather. Heavy storms around the cape presented difficulties



The "Governor Warfield" in Operation. Note the Boulders Pushed Aside by the Dredge Being Drilled for Blasting.

The contract for the construction of the canal was awarded in the spring of 1909 to the Degnon Cape Cod Canal Construction Company of New York, of which William Barclay Parsons, of New York is chief engineer, Eugene Klapp of New York, deputy chief engineer, and Charles T. Waring resident engineer at Sandwich, Massachusetts. The shovel work was sub-let to Wilson and English, C. W. Reynolds and Foley Brothers. Recently, however, Foley Brothers have taken over the Wilson and English Company's contract and equipment. The dredging is being done by the Furst-Clark Construction Company of Baltimore.

The heaviest excavation is on the watershed between the Monument and Scusset Rivers, where

both to this work and the early dredge work.

Later in the summer two dredges were put in operation at the west end, in Buzzards Bay. One of these was a dipper dredge and the other a bucket dredge. They worked on the approach channel between Wing's Cove and the mouth of the Monument River, taking out about 230,000 yards here, and also doing some work on the excavations for foundations of a relocated railroad bridge near the mouth of the river. At the eastern end two Heyworth-Newman dragline excavators were started. These machines excavated the top of the canal prism and deposited the material along the sides in dikes, behind which it was proposed to pump the spoil from the hydraulic dredges.

At the present time there are in operation seven dredges, three shovels and some miscellaneous equipment such as clam shell derricks. The 15 inch hydraulic dredge "Federal", the seven yard dipper dredges "National" and ' Capitol" and the ten yard Atlantic type dipper dredge "Governor Warfield", on the western end; and the seven yard dipper dredges "Weymouth" and "International" and the ten yard Atlantic type dredge "Governor Herrick", on the eastern end.

The ten yard dipper dredges are making heading cuts following the shovel work, and the seven yard dipper dredges are following them completing the canal.

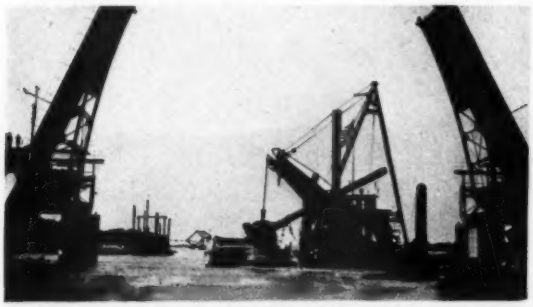
The hydraulic dredge "Federal" is at work in the Monument River just above Bourne

The Atlantic type dredges, the most modern on the canal, are three miles apart working toward each other, and Foley's contract. The latter consists of the digging of the canal prism through the ridge separating the head waters of the Monument and Scussett Rivers.

The contract has been made unusual by the method of diverting the course of the Monument River and of handling the springs, which honeycomb its bed, in order to make possible shovel operation. The canal follows the course of this river for about a mile just west of Bournedale. At this village a dam was constructed causing the Monument River to flow north through a channel into Scussett Harbor. The river channel is kept dry by the use of large electrically driven centrifugal pumps. Eight in all are in operation at various points from Bourne east to Bournedale. They are operating twenty four hours a day at full capacity. The water is pumped into the channel mentioned above. Each of the larger pumps has a 50 horsepower motor and has a capacity of 4400 gallons a minute. A better idea of this enormous capacity can be obtained when it is explained that a room 14 or 15 feet square and 10 feet high full of water could be emptied by one of these pumps in three and one-half minutes; or that it would take 3 or 4 hours to pump dry the lake in the Boston Public Gardens.

The Cape Cod Canal Between Bourne and Bournedale. Shovel and Centrifugal Pumps in Action.

The shovels are used in the prism. The equipment consists of two Bucyrus 70 ton shovels, one Marion model 60, two Baldwin and six Vulcan locomotives and seventy 4 yard Western dump cars. The material is sand, glacial drift and boulders, made rather difficult to handle by the condition of the ground. This consequently resulted in the yardage running rather unevenly. However, before Wilson and English turned over their contract to Foley Brothers, one of their 70 ton Bucyrus shovels between March 1st, and February 28th, 1913, moved 909,010 cubic yards or an average of 34,084



The Dredge "Governor Warfield" at Work in The Draw of Bourne Highway Bridge.

yards per month. The total number of working days was 313—32 days having been lost on account of weather and other reasons. This left 281 days when the machine was actually at work. The average daily output for the period was 1456 yards and the highest monthly record 44,301 yards. James English was superintendent at the time and E. F. Colbath engineer in charge of the shovel.

Foley has two dumps both on the south side of the canal between Bourne and Bournedale about one-quarter mile from the canal, one necessitates a haul of about half a mile and the other about a mile. The material is used to fill in marsh land rendering it practicable for commercial development. Foley has in addition to the above equipment, two clam shell derricks used to dig a sump for the pumps.

The excavation is somewhat over 65% completed at the present time.

The most interesting and the most modern dredging equipment are the two 10 yard Atlantic type dipper dredges at Bourne and Bournedale. One was built at the Buzzards Bay and the other at the Sagamore entrance of the canal, and they have been used in the channel, working towards each other. The material encountered is very mixed, but consists principally of the hardest kind of cemented gravel, sand and boulders. The minimum depth of digging is 39 feet. The material is dumped into scows of 600 yards capacity and towed to the dump about five miles away.

Since being put into commission in July 1912, these dredges have had a steadily increasing output. In the month of May 1913, the "Governor Herrick" made the remarkable output of 157,000 cubic yards, scow measurement. In the same month the "Warfield" in Bourne, with an 8 yard dipper instead of one of 10 yards capacity, dug 87,000 cubic yards of extremely hard cemented gravel, clay and large boulders.

An attempt was made to use hydraulic dredges on this work but the large number of boulders prevented its complete success. These boulders at times ran as large as 50 to 60 tons each. When these are encountered the dredges push them to one side with their dippers and they are blasted. It has often happened that one becomes wedged in the dipper rendering it necessary to blast it in place. This has been done frequently without apparent injury to the dipper.

The design and construction of the dredges contain many interesting features. Both have steel hulls built to conform to the American Bureau of Shipping rules. The hulls were built complete in the shops of the American Locomotive Company and shipped, knocked-down, to the Cape. They are equipped with crowding engines in order to permit them to dig their own flotation without difficulty and to enable them to reach far over the scows in dumping. The forward spuds are placed about 18 feet back from the bow in order to allow the boom to swing past the right angle and thus give the greatest possible working range. Instead of one stern spud,

Boom and Boom Machinery of the "Governor Warfield".

which is the practice with this type of dredge, both boats are equipped with two. They are equipped with twin hoisting ropes running over double grooved sheaves and through an equalizer on the dipper. This was done in order to get small diameter ropes with the largest possible sheaves. This has added greatly to the life of the hoisting ropes.

The main hoisting engines are 18″ x 24″ with steam reverse gear. The swinging engines 10″ x 14″ with balance valve reverse. The crowding engines 12″ x 15″ of the same type, The forward spuds are operated by 10″ x 14″ engines of the same type and the stern spuds by two 8″ x 8″ engines, controlled either at the spuds or in the operating room.

The two forward spuds are 70 feet long by 42 inches square of structural steel. Heavy cast steel hinged flappers are attached to the lower ends for use in soft material. The stern spuds are 75 feet long and 30 inches square of structural steel.

The steam plant consists of two Scotch Marine boilers, built for a working pressure of 150 pounds per square inch. Each has a heating surface of

Foley Bros.' 70-C Bucyrus Shovel Prepairing for the Dredges.

1350 square feet. Each dredge is equipped with an auxiliary vertical boiler 48 inches in diameter by eight feet high, carrying 135 pounds of steam per square inch.

In all there are 17 sets of engines including the pumps on each dredge. Two deck winches for handling scows, a surface condenser, fresh water tanks, a 7½ K. W. electric lighting plant, a refrigerating plant, up-to-date sanitary arrangements and accommodations for 40 men are also supplied.

On both dredges the operating room is located on the upper deck. This not only gives the operator a clear view of the dipper and spuds, but, (which is of greater advantage from the practical operating standpoint) allows him to see the hoppers of the dump scows when the dipper is being lowered into the pockets.

The dredges are equipped with an up-to-date refrigerating plant installed by the Brunswick Refrigerating Company.

The boom is of the structural steel girder, straight taper type, 57 feet long, with a 24 foot swing circle riveted to the base. A very satisfactory steam dipper-dump device is located on the boom.

The hull is 130 feet over all, 42 feet beam, 12 feet deep at the bow and 10 feet at the stern.

Both dredges have given an excellent account of themselves and have proved perfectly adapted to the conditions.

It was expected at one time that the canal would have been finished by 1913, but many unexpected conditions were encountered, which delayed work considerably. About 25% or 2,000,000 yards remain to be excavated. It is estimated at present that 1915 will see the work finished and the canal opened for navigation.

Spiders on the Panama Canal Work

A number of spiders at Gorgona Shops are contributing their little share to the construction of the Canal. They are in the instrument room, and are carefully protected, because from their cocoons the instrument makers procure filament for use in the transits of the surveyors. In the microscopes of the transits are very fine threads by means of which the surveyor determines when his instrument is centered upon an object. This thread is of platinum when the instruments are new, but when it wears out and must be replaced the instrument repair men at Gorgona have been using the thread taken from the cocoon of a certain variety of spider that has been encouraged to multiply in the instrument shop for the past seven years. This use of the filament from the cocoon is not original on the Isthmus, indeed it has been a common practice for many years.

It has been found that when the instruments so repaired are used early in the morning or during a rain the thread does not remain taut, because the instrument itself contracts. As soon as the instrument warms up, however, the spider web answers its purpose very well. In order that there may be no time of the day in which the transits may not be used, an order has been placed for platinum thread. As soon as it arrives on the Isthmus the use of the spider web will be discontinued, and the Canal force will be reduced by at least half a dozen more workers, for there are at least that many spiders spinning fiber at Gorgona Shops.

Canal Record.

"Yes", said the eminent specialist to the tramp who had called upon him, "I will examine you carefully for ten dollars".

"All right, Doc", said the tramp, resignedly, "do that, an' if you find it I'll give you half".—Ideal Power.

"Now, Pete, did you steal those chickens, or didn't you"?

"Well, you see it's dis away, I thought I did steal dem chickens but after what dat lawyer at de court done say in ma defense, I'se sure I didn't".—Wetzel Servise.

"Were your problems all correct, dear?"

"No, mamma, they were every one wrong," replied the child

"All wrong?" repeated the amazed mother. "Oh, I'm so sorry."

"Well, mamma," said the little one consolingly, "you needn't worry. All the other little girls' mammas had them wrong too".

Ideal Power.

Views of W. R. Spencer's Contract on The K. C. C. C. & St. J. Ry. near Excelsior Springs, Missouri.
70 Ton and 40-R Bucyrus Shovels Digging Rock.

UMI

Shovel Work on The Kansas City, Clay County and St. Joseph Railway

ON January 31st, 1913, an electric car left Kansas City for Excelsior Springs, Missouri. This probably does not sound extraordinary to the outsider, but to the Kansas Citian it had a real meaning. That particular car marked the opening of the Kansas City Excelsior Springs electric line. It marked the opening of the great Armour-Swift-Burlington Bridge for passenger traffic, but more important is the fact that the north bank of the Missouri is joined to Kansas City, and every one here feels that a new manufacturing center for the southwest is now a reality.

W. T. Murray's 40R Bucyrus near Liberty, Missouri.

The Kansas City, Clay County and St. Joesph Electric Railway was started in the fall of 1911. Corrigan, Murray and Spencer secured the general contract which involved about a million yards of material with a considerable per cent of rock. Wm. Spencer had the heaviest cut amounting to a hundred and fifty thousand yards of rock. Wm. T. Murray also had a heavy piece of the grade to do just out of Liberty, Missouri, consisting of 60,000 cubic yards. This ran about 65 per cent earth and 35 per cent rock. The digging on the whole was easy and contained no particularly heavy cuts. The outfit consisted of a 40R Bucyrus shovel, fourteen 4 yard Western dump cars and two 18 ton Davenport locomotives. The 40R was put to work on the first of March 1912, and gave excellent service. In reference to its work, Mr. John A. Murray writes on June 8th, 1912 as follows:

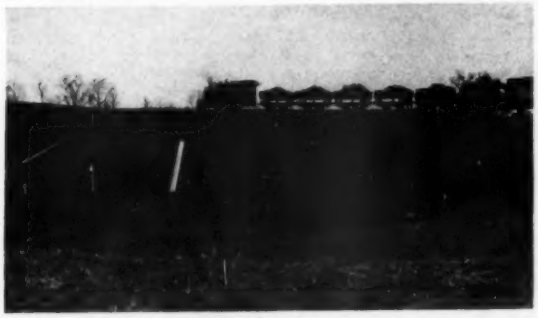
"This afternoon we finished a cut of about 40,000 cubic yards, a mile east of this place, for the K. C. C. C. and St. J. Ry., and I am so well pleased with the work of the 40R Bucyrus shovel used on this work, that I want to tell you of a record run we had Monday with the outfit.

The last six thousand yards of the cut had to be hauled a distance of thirty-five hundred feet to the fill. The actual running time in moving this portion of the material was forty-nine hours. On Monday using two trains of seven Western four yard dump cars, and an 18 ton Davenport locomotive on each train, we loaded 420 cars, during ten hours. Every car was heaped to the guards, and the engineer's estimate on the day's run is 1700 yards".

W. M. Spencer had a more difficult proposition. This work, as stated, lay near Excelsior Springs, Missouri, and amounted at first to about 100,000 cubic yards, practically all solid rock, the heaviest work on the line.

Work was started the last of October 1911, with a 40R Bucyrus, three 18 ton Davenport locomotives and thirty 4 yard Western dump cars. Later on the railroad company widened the cut in order to use the extra material for ballast, which increased the yardage to 150,000 cubic yards. This further enabled Spencer to use his 70 ton Bucyrus in the heavy rock, which was much harder than at first expected. The cut was about 1,500 feet in length with a depth of 63 feet and a bottom of 18 feet. The slope was one-half to one. The rock was limestone of such a consistency that it had to be thoroughly blasted.

Another View of Murray's Fill.



A Fill near Liberty, Mo.

Spencer, as above stated, furnished the ballast for the road from his rock cut. This was loaded in four yard Western cars by his 70 ton Bucyrus and carried to a No. 8 Austin gyratory crusher. 2000 yards of ballast were used to the mile.

The road is a first class electric line in every respect with the very latest equipment in use in every department. Bridges are all of concrete and the ballast of the road bed is rock. Hourly service has been commenced, one hour being the schedule time between Kansas City and Excelsior Springs.

A Novel Method of Lowering a Shovel Into a Quarry

The Elmhurst-Chicago Stone Company recently attempted an unusual method of lowering their new 65 ton Vulcan shovel into their quarry at Elmhurst, Illinois.

Two 100 ton Bucyrus wrecking cranes were borrowed for the occasion. The shovel was picked up and lowered half way down as shown in one of the accompanying photographs. At this juncture it was decided that this method was not practical. The shovel was lifted out again and successfully let down a steep incline. This operation is shown in the other view.

Charles Webber had charge of the operation and is now running the shovel.

Lowering The Vulcan Shovel Into The Quarry

Bucyrus Wrecking Cranes Lowering 65 ton Shovel Into The Quarry

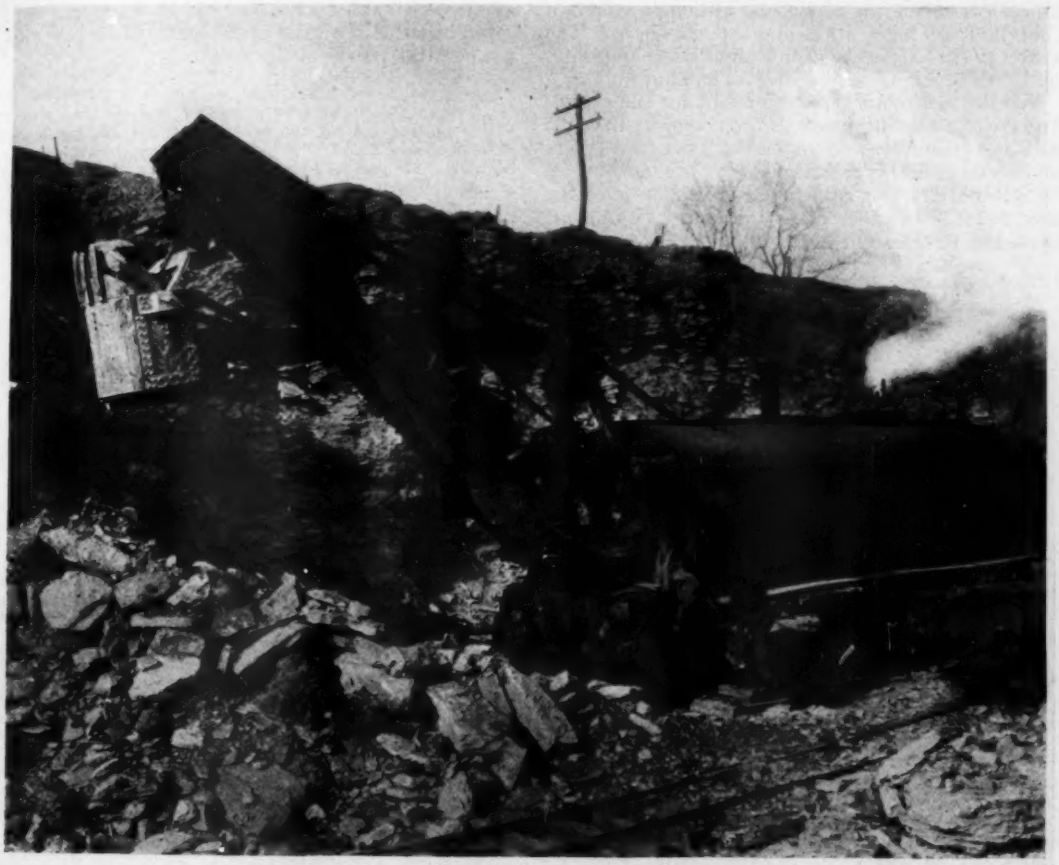
Construction Work on The L. & N., Winchester-Irvine Cutoff

By L. T. Russell

THE construction work on the Louisville & Nashville Railway's cut off between Winchester and Irvine, Kentucky, is well under way. The several contractors, among whom are Johnson & Briggs, Sturm & Dillard, Jones-Gray, J. M. Hassett & Co., and the Burton Construction Company, are all busily engaged in their respective sections and the monthly estimates of the work done are reaching respectable figures for all concerned.

Johnson & Briggs have the first section out of Winchester. They are using two Bucyrus shovels and are making good progress, although the necessity of maintaining tracks for daily service in the vicinity of the Winchester yards renders the work a little more difficult than it would be otherwise.

Sturm & Dillard have the section (about 2½ miles in length) immediately adjoining Johnson & Briggs on the south. They have a nice piece of work including one tunnel of about 700 feet and have the best compressed air plant seen in the entire work. They now have in operation one Bucyrus and one Marion shovel. They are getting good results, although on one part of the work the rock breaks very large, making it rather hard to handle. They figure on getting through with the work next



Johnson and Briggs' 70C Bucyrus Shovel in a Heavy Rock Cut Near Winchester, Kentucky.

season. They are now working a force of from 100 to 150 men, with labor rather scarce.

Burton Brothers have the first section out of Irvine, Ky. They have two new Marion shovels for this work, although only one shovel is in operation so far. Quite a lot of their work has been team work, a good portion of which has been completed.

About six miles from Irvine is located the camp of J. M. Hassett & Company. He is using three shovels, two Marions and one Thew and has made good progress with his work. He expects to finish up easily during next season, although common labor is a problem with him as elsewhere. The greater part of his excavation is sand stone and slate, the latter breaking very coarse when shot.

All the contractors deserve credit for the energy displayed in moving plant to their work. In some cases steam shovels were moved by their own power for several miles over turnpikes to say nothing of the locomotives and cars that were taken over the same roads. In other cases the heavy equipment was taken to the scene of operation by scows or flat boats, but in every case it meant hard work and lots of it.

A feature of the work deserving special mention is the suspension bridge put up by Mr. John Dillard on their work to span a narrow but deep ravine. The structure is, of course, very flexible, but the method of dumping is such that only empty cars run out on the bridge, they being dumped one at a time as they reach the end of the fill. The first cost was considerable, but the entire structure will be available for other work when this fill is completed as all wire, cables, ties, etc. will be recovered upon completion of the present fill and will be ready for use on other points of this work.

Two men were working in a ditch and got into a fight. Finally one crawled out and went home. His wife met him at the door and exclaimed: "Why Ole, what is the matter wit you"? Said Ole, "Me und an Irishman was working in ditch, und got in fight. He bat me in eye and say, 'You——Svede, you'! He smash me in nose and say, 'You ——Svede, you'! Den he hit me in mout, knock dese two teet' out and say, 'You ——Svede, you'! And all de time (laughing) I vas a Norwegian".—Ideal Power.

Dunn & Lallande's 18B Bucyrus Shovel in a Road Cut, Birmingham, Alabama.

Road Construction by Revolving Shovel in Birmingham, Alabama

AN 18B Bucyrus shovel owned by Dunn and Lallande Brothers of Birmingham, Alabama, for street excavation near that city, has been doing some record work.

The breast cut in which this shovel has been operated has an average width of 27 feet and a depth of nine feet. The material consisting of a hard, gritty "chirt" which has had to be shaken up slightly with powder. The blasting however has not been sufficiently thorough to prevent the occurrence of many hard spots not effected by the powder which offered extremely hard digging for a shovel of this size.

The accompanying views show a certain portion of the work under way and will give the reader a fair understanding of its character.

A Portion of the Finished Cut

For several days in succession this shovel has succeeded in moving ahead 100 feet of the above mentioned depth and width without trouble. In a ten hour period it recently dug a cut 33 yards long, 9 yards wide and 3 yards deep, which, according to Mr. Dunn's figures amounts to 900 yards. On the morning of June 18th this same shovel loaded 85 one-half yard wagons in one hour, moving up three times during that period. This means an output of 127 yards per hour, which is considered excellent when the conditions are taken into consideration.

This shovel made perfect 1½ to 1 slopes and very little hand trimming was found necessary.

About 1,500 pounds of coal were consumed per day. Water was furnished by the city line and from three to four tanks per day were required. The capacity of the shovel tank is 350 gallons.

The shovel is of the standard 18B type built by the Bucyrus Company. In this instance, however, it is equipped with a four wheel standard gauge truck instead of traction wheels. It carries a ⅞ yard dipper, which when heaped up has a capacity of one cubic yard. The dipper, which is the standard type, is particularly suited to this class of work. The front is flat and is fitted with four teeth. As the "chirt" lies in layers this construction permits the teeth to get under the strata on a parallel line, which, of course, considerably reduces the resistance and increases the digging power of the shovel. The shovel has a dumping reach of 22 feet 10 inches and will cut a level floor 36 feet in width.

The shovel crew consists of an engineer, a fireman, and two pit men. A. G. Haigler operated the machine.

An Unusual Use For a Shovel

This photograph was taken in Wetmore Quarry near San Rafael, California.

A blast had blown away a portion of the roadway leading into the quarry. Under cover of the darkness of the following night a number of horses taking their accustomed trail slipped and were hurled to the bottom of the pit. They were lifted from the pit by the 95 ton Bucyrus shovel and carried away in dump cars; an uncanny, but certainly an unique use for a steam shovel.

Pat and Mike were working in a ditch. Says Pat:—"Moike an why does yer talk to yerself loike thot"?

Mike:—" 'Cause I get such dom foine answers".

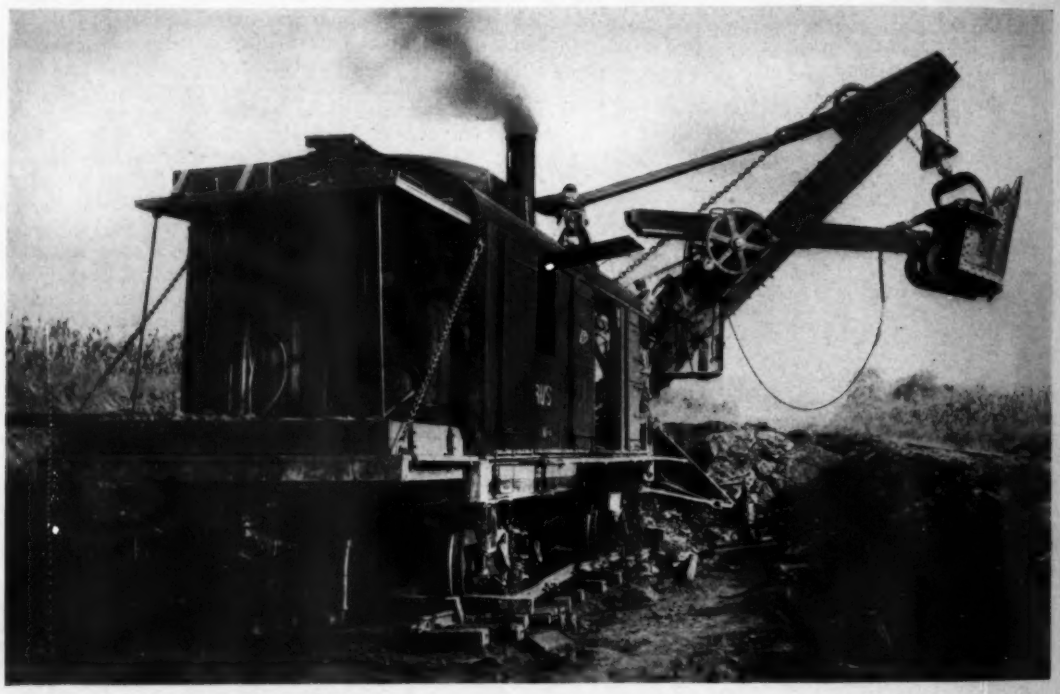
A. G. Fretwell's Contract on the L. & N.'s Nashville-Birmingham Cut-off

THE L. & N. extension between Nashville, Tennessee, and Birmingham, Alabama, consists of 125 miles of single track line through a very rough and rocky country. This, as might be expected, has developed some interesting shovel work.

A. G. Fretwell has four miles of heavy work in the vicinity of Franklin, Tennessee. His contract comprises about 160,000 yards of material, nearly 80% of which runs solid rock. He is doing this work with a 60-C Bucyrus shovel, two 12 ton Davenport dinkeys and twenty 4 yard Kilbourne & Jacobs dump cars, made up into two trains of ten cars each.

The cut measures 24 feet wide on the bottom. This would under ordinary circumstances, have been handled in one cut but the underlaying strata of rock is covered with a capping of earth. This overburden was first removed, the shovel track having been laid on the top of the cut. This operation is shown in the accompanying illustration.

After the earth had been removed the loading track was shifted into the cut, which had been made sufficiently wide to allow for this track. If this had not been done, it would have been necessary to thorough-cut, which of course would have greatly diminished the output, since but one car could be "headed in" at a time. The rock was blasted ahead of the shovel, and the material moved about 3,000 feet to the fill.



A. G. Fretwell's 60-C Bucyrus Shovel Removing Overburden Before Making Rock Cut:

The water for the plant was pumped from a nearby creek by means of a steam pump, into a supply tank located on the work. A pipe line was run from this tank along the cut supplying the locomotives and shovel. The coal was hauled from a near by switch.

The outfit and method of operation have proved extremely successful.

The Excavating Engineer

[FORMERLY STEAM SHOVEL NEWS]

A Monthly Publication Devoted to Excavating *and* Allied Subjects

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THE EXCAVATING ENGINEER PUBLISHING CO.

Bradley Van Brunt, Manager *and* Editor

267 National Avenue Milwaukee, Wis., U. S. A.

Danger Ahead

Within the last few years we have witnessed a growing agitation against the so called unfair and arbitrary methods of railroads and other big public service and semi-public service corporations, an agitation, which, in certain cases has undoubtedly been merited.

Should we take the trouble, however, to turn back and study the history of certain agitations, which during their existence had stirred to the very marrow the wrathful indignation of the public, we would doubtless discover that after the probers had probed and the agitators had agitated, the monsters were not always as monstrous as at first blush the inference of guilt had seemed to indicate.

Assuming, however, for our present purpose, that these corporations were as black as they seemed to be painted by the press, the politicians and business interests of the country, we propose to point out in as forceful a manner as we are able, that right here is a germ of very grave danger to our future prosperity unless the people of this country are wise enough and clear headed enough to recognize the gravity of this danger and to act accordingly. Though bad corporations certainly exist and flagrant examples of arbitrary methods have frequently been spread in staring head lines before the eyes of the masses, yet when looked upon in a broad gauge way, does this constitute a good reason why we should judge the great body of far sighted, public spirited law abiding corporations by the few which have played the narrower game? Bad news travels like wild fire, we seize upon evidences of crookedness here and there and paint the whole industrial world with this unhealthy hue. We all know that if it were not for this tremendous agitation which has scared away investors and rendered it more and more difficult for railroads to raise capital, we would be witnessing far more construction work than is going on at the present moment. If this sentiment continues to grow, the prosperity of the country is bound to be throttled, and we will find ourselves in the cold, grey dawn of bad times. Every contractor knows what this means! It is therefore incumbent upon us individually to recognize this and bring it home to our friends, and our friends' friends in order that this tide of danger may be stemmed before it is too late.

Construction Outlook

Since our last number went to press, business in general has improved slightly. Manufacturers of railway and contractors' equipment have noticed a slight pick up in their orders. In the security market an instance has occurred, which, in our opinion, promises well for the future of railroad work. We refer to the fact that the $88,000,000 worth of Southern Pacific stock, which was recently disposed of, was not only over subscribed, but English, French, German and Belgian bankers were interested. This indicates beyond question that the bad results of the Frisco failure, mentioned in our last number, have somewhat disappeared. This is the first time in six months that Europe has shown an interest in our securities.

The past month, however, has been very dull both in regard to contracts placed and prospects for new work.

Only one railroad contract of any size has been let since the Illinois Central's 1,000,000 cubic yard contract awarded to Robert Grace Contracting Company, the latter part or July. We refer to MacArthur Brothers' contract for the construction of 38 miles of line in the Coquehalla Canyon, B. C. for the Kettle Valley and the Great Northern Railroads. This will amount approximately to two million dollars and will include some heavy rock and tunnel work. Except for this, there is hardly anything worth mentioning, except perhaps the Chicago, Milwaukee & St. Paul's 13 mile Willapa Harbor extension in Washington amounting to about $500,000, which was awarded to the Keasel Construction Company of Tacoma. Robert Sherer & Co., got ten miles on the San Diego and Arizona

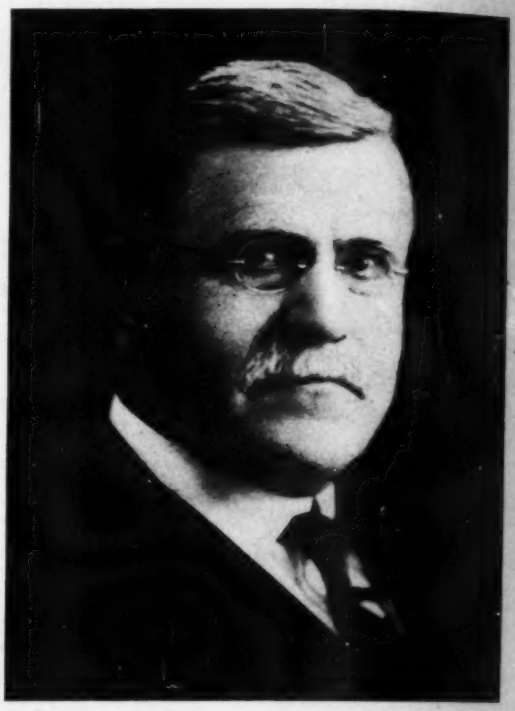
early in the month and List & Gifford have 90,000 yards on the Mobile and Ohio.

Highway improvement is active, especially in New York, Pennsylvania, Massachusetts and Mississippi. New York has let contracts for the improvement of 118 state roads and Mississippi and Massachusetts are building a considerable amount of state highways.

Drainage and levee work continues good. A great deal of work is planned or up for bids. The largest is 1,563,000 cubic yards ditch and levee work on the Elsberry Drainage District, Missouri. The Sanitary District of Chicago, will open bids on September 11 for section 9 of the Calumet-Sag Channel including 875,000 cubic yards of glacial drift, 50,000 cubic yards of solid rock and 70,000 square yards of rip rap.

The St. Francis drainage district in Arkansas are offering 350,000 cubic yards of dredge work and 315,000 cubic yards of levee enlargement, and the Runningwater Drainage District in Lawrence County, Arkansas, 18½ miles of ditch work, approximating 403,000 cubic yards.

Chas. J. Deckman, Pres. National Paving Brick Manufacturers Association



W. P. Blair, Sec. National Paving Brick Mannufacturers Association

National Paving Brick Manufacturers Association To Meet

Engineers and contractors from many sections of the country are to gather at Cleveland, Ohio, September 17 and 18 on the occasion of the tenth annual meeting of the National Paving Brick Manufacturers Association. In former years the Association had held its annual meetings during winter months, but at the last yearly assemblage of the paving brick manufacturers it was decided to hold future conventions during an "open season".

This will afford, instead of the usual program of written papers, discussion and criticism of brick street and brick road construction methods while work on the highways is in actual progress. The large amount of construction work in Cleveland and Cuyahoga County will afford splendid opportunity for investigation in a most practical way.

Chief engineer Robert Hoffman and paving engineer Joseph Bayne of Cleveland, chief engineer Frank R. Lander and road engineer James M. McCleary of Cuyahoga county, state highway commissioner James R. Marker and W. A. Stinchcomb, county engineer elect will facilitate arrangements to make the occasion one of real interest.

Automobile tours will be run over the oldest of the thousand miles of city streets and country roads which have given Cleveland and Cuyahoga county a wide name for permanent street and road construction.

At an evening dinner on the evening of the 17th the occasion will be made enjoyable with informal talks on street and road building. Headquarters will be at the Statler hotel.

Officers of the National Paving Brick Manufacturers Association are, Charles J. Deckman, Cleveland, president; Will P. Blair, Cleveland, secretary; C. C. Barr, Streator, Illinois, treasurer.

Don't Forget To Think

This old world goes around and we are at a standstill thinking where to get off. Some of our great men were heavy thinkers, and the old saying is "think twice before you act", but I believe you should think four times, but not too long, or you will forget what you were thinking about. Keep your brain supplied with an ample amount of good thoughts; it is a good lubricant for your top story. If you are not thinking, your thinker becomes dry and gets cutting away from its bearing, causing you to be very forgetful and to allow things you should remember get away.

For example, you are doing some repair work on your machine, possibly babbitting some bearing or taking up brasses. This job should be given a severe inspection before leaving. There are men who are very attentive to this part of their work but there are others who are not. The latter are the men who do not get their "thinks" together. For instance if you should get a few idle days to do repair work, don't slap things together and say, "Oh, I guess it's alright". For by so doing the very first thing that is apt to happen when you start the shovel on the working day is the result of not thinking. You may have your bearing too tight and in consequence you are compelled to take out a liner or some other small matter. The result is you have 40 or 50 men, good and fresh after a few days rest, with their hands down simply because you did not try this part you repaired. It pays to think, if it does not pay you, it pays some one else; so don't forget to think!

Griff Hughes,
Girardville, Penn.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review in this column such books and catalogs as are sent to us. Books reviewed in these columns will be supplied by The Excavating Engineer Publishing Company at the prices named.

The Lehigh Valley Coal Company, of Wilkes-Barre, Pa. have recently published the first number of its Employees' Magazine. The magazine has 34 pages and is printed on high grade enamel paper. It is a well illustrated, a well printed, and above all, a readable paper. As the foreword states, it is the result of the realization by the company of "the necessity of a medium that would help all the men all the time". Its purpose is to acquaint the employees of the company with up-to-date and efficient mining methods; to put them in touch with improvements in machinery, equipment, apparatus, modern construction, operations, etc.; to assist them in avoiding accidents and conserving life and property; and to enable them to exchange their ideas, suggestions and experiences, in order to better their conditions in every possible way. Its editor Mr. W. S. Hachita deserves great credit for presenting interesting material in such an interesting manner.

The Cyclone Drill Company, Orrville, Pa. Catalogue B-25, describing cyclone drills, 70 pages, 6 x 11. A well printed, elaborately illustrated book giving a very full description of their No. 14 drill. A drill designed particularly for big blast hole work. The various parts which go to make up its construction are illustrated by well chosen illustrations, and each part is thoroughly described. The catalogue contains specifications of this drill driven by gasolene, electricity, steam and compressed air, both traction and non-traction. Brief description is given to other equipment, such as special tools, fishing tools, blowers, etc.

Hazen's Railway Contractors' Hand Book, by John M. Hazen, 160 pages, board cover, 4½" x 6", price $2.00, postpaid. This book is, in every sense, what its name implies—of a convenient size to carry in the pocket and contains one hundred and two tables of level cuttings or banks for single or double track and for second track work; from a ten-foot road bed to thirty-two feet in width and from a vertical to a three-to-one slope, to a height or depth of thirty-five feet and nine-tenths by tenths of a foot.

The second track tables are from a ten-foot road bed to twenty feet in width. Also nine tables for various shaped ditches, sixteen tables of wages, eight tables of board; number of spikes, ties, joints and cubic yards of ballast per mile of track; rules for stub and point or split switches; elevation of outer rail on curves; table of acres required per mile and per hundred feet, from one foot to 100 feet in width; contents of tanks of various diameters and heights; rules for measuring hay in stack and corn in crib; to merge a square into an octagon; pile driving; shrinkage of embankment of various soils; cost of masonry, concrete formula, weight of stones, brick, etc., together with much practical information that can be gathered at a glance. To the busy contractor, sub-contractor, walking boss, foreman, station man, road master and section foreman, this book will be of great value.

John M. Hazen, 16th Ave. and Fillmore St., N. E.
Minneapolis, Minn.

The T. L. Smith Company, Milwaukee, Wis., Catalogue No. 252, Rock Ore and Gravel Handling Machinery, 40 pages, 6 x 9" flexible cover, illustrated. Describes and illustrates Telsmith Primary Rock Breakers, formerly known as the Symons Gyratory Crusher. Certain types are made portable adapting them to road work, and are equipped with folding bucket elevator. This machine is also fully described as well as a friction hoist for a 1½ yard quarry cars, five sizes of rotary screens, elevators, the Telsmith jaw breaker, portable bins and portable gravel plant.

The Otto Gas Engine Works, Philadelphia, Pa. A booklet entitled "The Otto Cycle", an interesting story of Dr. Nicholas Otto and the development of the internal combustion engine. 24 pages, 5" x 7½".

DISCUSSION IS INVITED FROM MEN IN THE FIELD ON SUBJECTS HERE PRESENTED

Instructions for Erecting a Knock-Down Shovel

(Continued from August Number)

Final Erection in Field.

First attach coal platform on rear.

Put all fittings on boiler, fill boiler and get up steam.

See that all oil cups are on and every bearing is properly lubricated.

Fit up lubricators to steam line.

Put on jack arms.

Put on propelling sheaves and chains.

Remove bar across front arch of roof which would prevent back leg from rising.

Put up A frame. This can be done by block and tackle. Care must be taken not to drop the A frame.

Replace bar across front arch.

Remove front removeable segment from swinging circle.

Fit boom hoist sheave under A frame head. This is an extra sheave for erecting use.

Releave hoisting rope from hoist drum under tilting sheave and up over boom hoist sheave on A frame.

Attach outer end of hoist rope (reaved as in the preceding paragraph) around heel (or lower end) of boom and shift boom so its center line points to center of swing circle casting. If necessary block heel of boom up to the proper level so it will enter recesses of swing circle center.

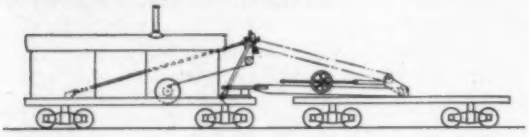


Fig. 1.

Swing the swing circle slightly so that opening points toward boom.

Unhitch cable from boom heel. Reave as shown in Fig. 1.

Operate main hoist drum slowly by steam (friction clutch in and brake thrown out as described later). This will first drag the boom until heel of boom is up against circle center. Care should be taken that boom enters circle center parallel and that the heel enters the socket on each side.

Continue to turn drum over by steam and boom will raise. Great care should be taken to see that swing circle is exactly parallel with boom in order to prevent bending circle.

Swing boom to center when just clear of car.

When boom is high enough apply brakes to main drum.

Connect boom guys to A frame collar (or trunnion).

Ease off on hoisting cable, boom being in its proper place.

Unhitch cable end from A frame. Reave cable direct from under tilting sheave over point of boom sheave (nearest middle), pick up dipper handle as shown in Fig. 2.

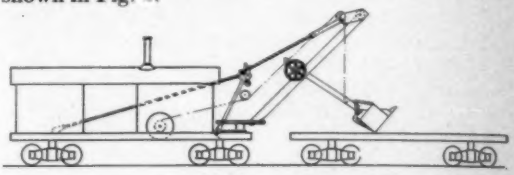


Fig. 2.

The saddle block should have been layed back on top of boom engines with nuts loose so end of handle can easily enter when it reaches the proper position. Be careful not to lose liners from between saddle block castings.

Remove cable from dipper handle and reave for work.

Be careful not to raise boom too fast—very little steam will do the work—too much may cause a smashup.

Men with bars should assist heel of boom to enter circle.

If in trouble apply foot brake and shut off steam.

Connect up ball joints and piping to boom.

The temporary sheave attached to the A frame should of course be removed during operation. The boom, piping and ball joint leaves not room for it.

Suggestions for Operation.

Always throw in hoist clutch before opening throttle to dig. (Variation from the rule is sure to produce trouble).

Never start to swing with dipper still digging, or even touching bank—dipper must be absolutely clear.

After dumping, first close throttle, then apply brake, then disengage friction. After this ease off on brake and lower dipper into pit. Lower it, don't drop it.

Don't hit car body, circle or trucks in lowering dipper into pit. This shows careless operating and runs repair bill way up.

Close swing throttle long before dipper reaches

corner. Let the inertia do as much work as possible —this prevents accidents and saves steam.

Be sure the cranesman eases on his crowding engine when dipper is full or when a hard spot is reached. Better to cut further along face than to fill dipper by crowding in quickly. However, this is a matter of judgment depending upon hardness of digging.

Watch boilers. Don't use bad water. Blow off if boiler foams.

Piping Water to the Shovel

On an average shovel job there generally are three methods of supplying a shovel with water; one by taking it directly from the locomotive, which in turn fills its tank at the point of supply, perhaps some distance away; another is from tank wagons; and still another by piping directly along the line of the work to the shovel.

An old shovel man tells us that although at first glance the first cost may seem prohibitive, piping is in the end far more satisfactory when the source of supply is not too far away. He advises us that the use of a pipe line will enable the shovel to load from three to four more trains a day, as it is impossible, of course, by the first method to take water from the locomotive while running. Furthermore, time is saved by the locomotive since it can take water at the shovel while the cars are being loaded. The equipment and labor necessary in the case of tank wagons, moreover, adds considerably to the expense of operation, although it does not present such a time element. All these factors will much more than make up for the first cost of piping.

The pipe should be an inch and a half in diameter and a hose of from 40 to 50 feet in length should be supplied. One man can handle this with ease.

This, or course, does not apply to winter work where there is danger of freezing. In this case one of the other two methods must be resorted to.

Poor Steaming

When a shovel steams poorly, poor coal is apt to get much more blame than it rightly deserves. As a matter of fact the cause can often be found elsewhere. It is up to the fireman to hunt this down. He should first be sure that he has a good fire; he should examine the front end to see if there are any air leaks; the ash pan to see it is full; the grates to see that they have not become clogged with clinkers and dirt; and the flues to ascertain whether they have become stopped up, or are leaking.

If none of these causes are evident, he should experiment with his fire. If there is not much smoke at the stack he should build it up, as it is possible that he is getting too much air through it. If a larger volume of smoke appears indicating that the fire is too heavy, he should let it burn down. If none of these effects a remedy, he should let the engineer worry, and if he worries in vain then curse the coal.

A Safe Way To Thaw Powder

Contractors who have been troubled with frozen dynamite will be interested in a simple but effective method of thawing, described recently by the Engineering and Mining Journal. The thawer, which has a capacity of eighteen 50-lb. cases, is nothing more than a double box built of 2 inch planks with an 8 inch space between the outer and inner boxes, which is filled with manure. A double lid, filled with manure, is used and the bottom of the inner box is also filled with manure, so that the powder is surrounded on all sides, top and bottom by the heating material. One inch holes are bored through the inner box into the manure-filled spaces to permit circulation of the heated air.

The powder may be put into the thawer while in its original boxes or the sticks may be put in loosely, which enables it to thaw a little quicker. Where loose sticks are placed in the thawer and different strengths of powder are used, it will be found convenient to make vertical partitions in the inner box, so that the different grades will not become mixed. It has been found that when the manure is fresh, the temperature of the inner box may become as high as 110° F. This arrangement does away with all the dangers and inconveniences of any other type of thawer and has been found satisfactory.

This device has been in use by Wetherbee Sherman & Co. Inc., Mineville, New York.

Wood Ashes for the Friction

Mr. O. T. Jones adds his opinion to those of many others of our readers, as to the best method of keeping the hoisting drum housing free from grease, and hence, of making the friction hold.

Mr. Jones tells us that wood ashes are best. The alkali therein has the property of cutting the grease and absorbing it. Care should be taken however to sift the ashes carefully so that no hard pieces get on the friction. For this reason wood ashes are preferable to coal ashes. Rosin, he says, is only good for new frictions, as it has a tendency to catch too quickly.

Watch Your Pop!

Judging from appearances few contractors realize the tremendous waste involved in allowing the safety valve to pop for any length of time. It has been demonstrated that each minute that a pop valve is open more steam is wasted than a shovel can use in the same length of time, or, in other words, as much heat as is contained in nearly a scoopful of coal.

The Aurora Dump Wagon

There are two extremes between which it is necessary to steer in order to have a good dump wagon, one which is practical yet strong.

These two extremes are well exemplified by many wagons which have been put upon the market in the past. The one is light and easily handled, yet so flimsy in construction that it could stand but a few months service of the kind that a contractor would ordinarily give it. The other is rigid in construction and strong enough to withstand the battering of the cyclops, but so heavy and clumsy that the very strength becomes a detriment.

The happy medium, a strong, light wagon, is indeed a rare combination, but such is the Aurora dump wagon, manufactured by the Western Wheeled Scraper Company, of Aurora, Illinois. It has been a difficult problem to make a wagon of sufficient strength to stand the hard service required of it by contractors and yet light enough for one team to handle without distress. In this new model these essential requirements have been embodied.

In the construction of the bed, Washington fir of the best grade, is used. The wood has the same strength as oak, with much less weight, so that it is ideal for this purpose. The side boards are steel channels filled with wood, a practically unbreakable construction. The manufacturers call special attention to the design of the door hinges, the construction of which can be noted in the illustration. It may be observed that a slot is provided for vertical play of the hinge pin, which gives flexibility to the door and prevents it from binding on the dumped load.

The wagon is built low, which affords the greatest possible ease for loading with grader, steam shovel or by hand. The discharge opening is unusually large. Light draft is accomplished by a short coupling and a wheel base of 7 feet 6 inches. The chains are entirely outside of the wagon bed. The chain guards are spiral and of malleable iron. The doors are so hung that they cannot strike the wheels. The inner edges are protected by channel iron, the upper edges of the sides and ends by angle iron and the lower inner edges of front and rear ends by band iron. A direct pull of the chain on the doors greatly increases the ease of operation. The front bolster is made particularly strong, being very thoroughly braced.

A jointed king bolt preserves the equilibrium of the wagon on rough or uneven ground. These are a few of the special features. No surplus material is used, but each part is made of proper weight and material for the purpose for which it is designed. Two sizes are offered, one of 1½ yards and the other of 2 yards capacity.

A Complete Electric Lighting Outfit for Shovels and Draglines.

Any contractor who has been obliged to install an electric lighting outfit on his machine in the field, can recount in detail the troubles he experienced. His generator doubtless had to be shipped from one place and his supplies from another. He may have found that he had forgotten to order enough wire and had neglected to take into consideration numberless small, but important things. The result was invariably delay, inconvenience and expense.

To obviate these troubles the Bucyrus Company have put on the market a lighting equipment for a dragline excavator or shovel, complete in every detail.

This outfit is packed and shipped complete with wiring, sockets and all necessary supplies. It is assembled in such a manner that it can be installed by an ordinary mechanic with little trouble. A diagram and complete directions go with the shipment to facilitate installation.

The equipment consists of an engine and generator with brackets for mounting, rheostat, switches and all necessary wiring, lamps, et cetera, as described later in further detail.

The engine is of the reciprocating type which, for this use, has been found to be more satisfactory than any other design. It is direct connected to the generator, the whole being a self-contained unit which completely eliminates the possibility of working out of line.

The engine-generator is remarkable for the simplicity of the design and the accessibility of all working parts, which greatly facilitates adjustment and repair.

The outfit for steam shovels includes the following:

2½ K. W. engine-generator, voltage 110.

2 line switches, suitably mounted.

20 16-candle power incandescent lamps, distributed as follows:

2 five-lamp clusters on the boom with reflectors and weatherproof caps.

3 outside lamps on either side of house near the roof.

1 lamp over rear end of boiler.

1 portable lamp with a 20-foot cord at rear end of shovel.

2 over main machinery.

Wires, guards, sockets, fuses, etc.

All outside lights guarded.

The dragline outfit is similar except for the distribution of the lights which is as follows:

2 arc lamps for the boom.

11 16-candle power incandescent lamps, distributed as follows:

2 on each side of house.

2 on each side underneath running boards.

1 near boiler.

1 portable lamp over main machinery.

1 over operator.

Where bank illumination is desirable an extra outfit is supplied consisting of two arc lights and the necessary wiring.

Manning, Maxwell & Moore, Inc. of New York City, together with their subsidiary companies, will move their general offices on or about October 1st, from 85-89 Liberty street to the new Lewisohn building, 113-119 West 40th street (near Broadway and running through to 114-118 West 41st street). This change is being made to meet the demand for a more convenient and central location, as well as larger space to handle material increases in their various lines, which cover electric traveling cranes, machine tools, engineering specialties, railway, machinists, engineers, factory and contractors supplies. A large portion of this product is manufactured by their constituent companies; The Shaw Electric Crane Co., The Ashcroft Manufacturing Co., The Consolidated Safety Valve Co., The Hayden & Derby Mfg. Co. and the Hancock Inspirator Co. They will occupy the twentieth and twenty-first floors of the above building, which will give them 28,000 square feet of space. This space will be exclusively for offices and is almost double that at present occupied for offices on Liberty street.

Bulk Cement for Track Elevation Work

The Chicago, Milwaukee & St. Paul Railroad began an experiment in the handling of bulk cement on track elevation work which marks the beginning of the use of bulk cement in this class of railroad work.

Three cars of Universal Portland cement, shipped to Bloomingdale Road for use in the Milwaukee & St. Paul elevation work on the Bloomingdale division, have already been used and the St. Paul road is considering the use of bulk shipment in several other elevation jobs which are now in process of construction.

The result of the experiment has shown that bulk cement can be handled from the car to the mixer so as to eliminate the work of two men which is necessary for the handling of sacked cement at each mixer and also do away with the work of one man who takes care of sacks at the three mixers on the job.

The Universal Portland Cement Co., sold the cement at 40c less per barrel than would have been charged had sacks been used.

Alabama

Notes from Birmingham

By R. S. Byron

Tht Ashville Construction Co. have about completed their work on the L. & N. near Warrior, Ala. and they advise that they will have all of their equipment on this work, by the first of September.

Harry Jones is running a model 60 Marion shovel for Thrasher & Gunther on the L. & N. work at Blount Springs, Ala.

Adams & Sullivan have just been awarded another job on the L. & N. double track at Brentwood, Tenn. This work consists of about 30,000 yards of some of the hardest rock that is found between Nashville & Birmingham. They are doing this work with an old 65 ton Bucyrus shovel No. 287 and are pushing the work all possible. They are double shifting this machine and crews consist of Robinson Brothers engineers and messers Boyd Perkins and Joe Manning, cranesman.

C. E. Herring and W. J. Ammons are running a 40-C Bucyrus machine for the Morrow-Kennedy Co. on the southern near Atlanta, Ga. and they report that everything is moving along very nicely.

Geo. Williams has just completed the installation of a new 40-C Bucyrus machine for the Morrow-Kennedy Co., of Atlanta, Ga.

Adams & Sullivan are finishing up with their work on the L. & N. double track at Bangor, Ala. and they advise that they have about 30,000 yards yet to move and expect to finish by the middle of September.

They are doing this work with a 65 ton Bucyrus shovel No. 387 and are moving from 350 to 450, 4 yard cars per day of 10 hours.

The crew on this shovel consist of Bill Williams, engineer and E. E. Bishop, cranesman. They are experiencing many slides and the work that they are now doing was caused by the slides, but they are not anticipating any further trouble.

Marshall & Pack are moving along fairly well with their work on the L. & N. double track and expect to finish this work in from 6 to 8 months. They are using a 65 ton Bucyrus shovel with a 3 yard dipper. The crew on this shovel consist of Morris, Manning and Harrington.

Alvin Jones is running a new Bucyrus 70-C shovel for T. Towles Co. on their L. & N. double track work at Brentwood, Tenn.

Arkansas

Helena—Bush & Adams, of Helena, Ark., were awarded contract for the delivery of 101,000 cubic yards of dirt, to be used as a fill and topping on the levee in the Cotton Belt district, south of Helena, Ark., on the Arkansas side of the river. Work is to begin immediately and must be completed by December 31.

California

Los Angeles—The Sharp-Fellows Contracting Company, Germania building, Los Angeles, Calif., reports good progress in its contract for constructing the Minkler Southern Railway Company's line from Minkler to Exeter, a distance of 40 miles.

San Francisco—Southern Pacific Co., contemplates extending its Porterville & Northwestern branch from Springville to Lindsay. From 20 to 25 miles of new road bed would be required.

Los Angeles—Robert Sherer & Co., Los Angeles, Calif., have been awarded contract for grading ten miles of line from point ten miles west of Seely to point four miles west of Coyete Wells, in Imperial Valley by San Diego & Arizona Railroad Co., E. J. Kallright, San Diego, Calif., is chief engineer.

Canada

Welland, Ontario—Section No. 3 of the Welland ship canal, tenders for which were received in Ottawa on the 27th of August is situated almost entirely within the town of Thorold. It is two miles in length and comprises the construction of twin locks Nos. 4, 5 and 6, and single lock No. 7.

A temporary diversion of the Grand Trunk main line which will be in use for three years, is provided for, and also a permanent diversion of the Welland division of the Grand Trunk railway commencing near Merritton station and extending nearly to Allanburg.

The contract provides for more work in a small space than has ever been performed under one contract before and the intricate and varied nature of the work will tax the resources and ingenuity of the firm of contractors, who are fortunate enough to obtain the contract.

The stupendous character of the undertaking may be realized from the following approximate quantities:

Rock excavation, 2,500,000 cubic yards.
Earth excavation, 3,500,000 cubic yards.
Watertight embankments, 1,000,000 cubic yards.
Mass concrete, 1,200,000 cubic yards.
Reinforced concrete, 35,000 cubic yards.
Concrete in weirs and bridges, 25,000 cubic yards.
Plan steel bars for reinforcing, 4,000,000 pounds.
Stone crushed to pass 2¼ inch ring, 1,000,000 tons.

The total cost of the work will approximate ten million dollars.

Hope, B. C.—The MacArthur Bros. Co., 1 Pine Street, New York, has been awarded the contract for the construction of 36 miles of railroad by the Kettle Valley Ry. Co., jointly with the Great Northern R. R. Co. This work is located in the Coquehalla Canon, B. C., and it is estimated that the cost of construction will exceed $2,000,000. The work consists of considerable heavy rock work and several small tunnels. F. C. Hitchcock, vice president and general manager of MacArthur Bros. Co., is in charge of this work and has established headquarters at Hope, B. C., where he intends to sublet a portion of the work at once.

Ottawa, Ont.—R. J. Tierney & Co., Ottawa, Ont., it is reported, has been awarded the contract for the construction of 12 miles of line from Ottawa to Greely, Ont., by the Morrisburg & Ottawa R. R.

Foreign Construction Opportunities

(From Daily Consular and Trade Reports.)

(When addresses are omitted they may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C. In applying for addresses, refer to file number.)

No. 11509.—The Public Works department, Rome, Italy, invites tenders for the Eritrean railways for the construction of section from Keren to Agordat at an estimated cost of $1,502,775, and for rolling stock estimated at $97,330. Tenders will be received through local agents only.

No. 11518.—Sealed tenders will be received by the Public Works department, Madrid, Spain, until September 22 for the construction and exploitation of a narrow-gauge line from Jumilla to Cieza. Tenders will be received through local agents only.

UMI

Georgia

Atlanta—The Morrow Transfer & Storage Company, of Atlanta are straightening line and double tracking on the southern railway just outside of this city. They are operating a 60-C and a 40-R Bucyrus shovel and one model 0 Thew.

H. O. Donnell is general superintendent and C. E. Swain walking boss. The 60-C is double crewed the engineers being W. J. Pearce and C. W. Cook; the cranesmen, M. O. Yount and H. H. Levitt, and the firemen, H. Delk and J. Hicks.

The 40-R is operated by C. E. Herring, with W. J. Ammons as cranesman, G. I. Walker is fireman and W. R. Bradley is foreman.

Augusta—A. J. Twiggs & Son, of Augusta, Ga., have been awarded contracts amounting to $300,000 for construction of levees in this vicinity. This firm is now building a gate across the canal, near the Warwick mill.

Illinois

Cairo—List & Gifford Construction Co. of Kansas City, Mo., secured the contract for 92,000 yds. of grading on the Cache levee at Cairo, Ill., awarded by the government. They also secured a steam shovel job from the Mobile & Ohio R. R., east of Beech Ridge, Ill.

Peoria—Work on the extension of the Chicago & Eastern Illinois into Peoria, Ill., has been suspended. Whether it will ever be resumed is not stated. About twenty miles of the line has been graded, but no track has been laid. It was planned to build at least 55 of the 80 miles of road originally proposed, which would have taken it to Chatham and then to use the Alton's tracks into Peoria.

East Alton—Ware & Reilly, Houser building, St. Louis, Mo., have 200,000 yards of grading work near East Alton, Ill., in the Wood river drainage district, to let.

Indiana

Princeton—Contract for ditches in Black river drainage district, 606,675 cubic yards, was awarded August 12, 1913, to Clyde A. Walb, La Grange, Ind. There were 12 other bidders. Harry C. Morrison, engineer. Embree & Embree, attorneys.

Winamac—Contract for constructing the Chas. G. Scholtz ditch, 205,505 cubic yards, was awarded August 16th, 1913, to the Foohey Dredging Co., Fort Wayne, Ind. C. E. Paul, construction commissioner.

Iowa

Legrand—The above photograph shows a 100-C Bucyrus shovel at work in the quarry of Dolese Brothers Company here. Chas. Hischer is engineer and Otto Mischke is cranesman.

Algona—Contract for excavating 764,257 cubic yards on drain No. 80 was awarded Aug. 6, 1913, as follows: Sections 12 and 13 to Thomas & Sweet, Royal Centre, Ind. Section 11 to A. S. White, Grinnell, Ia. Three sections of the tile work were awarded to A. Hines, Hardy, Ia., at $68,375. C. E. Payne, engineer.

Kansas

Pittsburg Notes

By W. S. Russell

We are having the hottest summer known in Kansas for many years, the temperature being from 100 to 104 for weeks at a time, but people go around in their daily vocations the same as usual, and but few heat prostrations are recorded. The farmers gather in their crops, the railroads run and the coal stripping steam shovels dig as much dirt as ever.

Coal is in fair demand and we quote prices as follows:
Lump F. O. B. cars at mines $2.00.
Nut F. O. B. cars at mine $2.00.
Slack F. O. B. cars at mine $1.35.
Mine run F. O. B. cars at mine $1.60.

The Moka Coal Company of Pittsburg, who are stripping coal near Mulberry on their 165 acre field with a 150 ton Bucyrus steam shovel are now shipping at the rate of 200 tons per day. Lee Bigley is superintendent at the plant.

The Pierce Coal Company of Mulberry, have started their new Marion steam shovel stripping on their 160 acre field two miles north of Mulberry. F. W. Pierce is in charge of their operations.

The Nesch Coal Company of Pittsburg, are a new firm to engage in coal stripping. Ribert Nesch of Kansas City, is president and his son John Nesch is general manager. They have just ordered a 175-B Bucyrus revolving steam shovel of the latest type and will open up a field on the Santa Fe R. R. The steam shovel is one of the most powerful ever built. It is fitted with a 75 foot boom, 3½ yard dipper and will dig 2700 cubic yards of overburden per day. The shovel is now being shipped from the works at South Milwaukee, Wisconsin.

The Nesch Company will erect a modern improved tipple of the lift type with screens for grading the coal. They will also put in tram tracks, cars, engines, pumps, piping and everything necessary for an up to date plant.

Ira Clemens, president of the Clemens Coal Company, has gone to Colorado for a two weeks trip. This company are now stripping a field of extra good quality of coal at North Pittsburg with a 150-B Bucyrus steam shovel, part of the overburden lying directly over the coal is of hard blue shale from four to six feet thick.

Harry Miller, general manager of the Pittsburg-Scammon Coal Company, recently left for Sheridan, Wyoming, for a two weeks vacation and to look over the greatest coal stripping proposition as yet known in the United States. But unfortunately the area is limited to two or three fields, containing in all about 800 acres. In one of these fields the coal averages 20 feet thick from fifteen to forty-five feet of overburden. In another field the coal averages twenty-five feet thick, with from eighteen to forty-eight feet of overburden. The coal is known as subbituminous, is practically free from sulphur and has no horseback running through it.

There are four companies operating underground mines in the district and the demand for the coal is somewhat limited. But the people out there have just discovered that part of the land can be stripped with the new type of revolving steam shovels so successfully used in Kansas, and that the coal can be produced at a much lower cost per ton than by the underground method, consequently stripping propositions are sure to be developed.

The Roy Millner Coal Company of Weir City, are operating their 150-B Bucyrus steam shovel stripping an 80 acre field a mile of south of town. A. W. Thompson is running it.

E. J. Scott of Smith, Scott & White has returned to Pittsburg and is stopping at the Stilwell Hotel. He will look after their coal stripping operations during the absence of E. P. White, who goes to Texas on a business trip of a week or two.

Stewart Crowe, of the J. R. Crowe Coal and Mining Co., spent several days in Pittsburg last week looking after their coal stripping and mining operations.

Robert A. Gray, manager for the J. R. Crowe Coal & Mining Co., at Weir City, has gone on a trip to the Old Country, where he will revisit the scenes of his boyhood days.

Frank W. Pierce of the Pierce Coal Company of Mulberry, Kansas, was a recent guest at the Stillwell hotel, accompanied by his brother who will assist in their coal stripping operations.

J. J. Stephenson, the well known coal stripper, is having a very enjoyable time on a trip to Vermont, where he has been visiting relatives. He is now on his return trip and may be home within a week or so.

The Pittsburg Machinery Company, located at the Stilwell hotel, are doing a nice business and their sales are rapidly increasing. They handle new and second hand mining machinery and supplies and repairs. Give them a call.

The Bucyrus Company are now putting in a stock of repairs for their coal stripping steam shovels with the Pittsburg Machinery Company. This will be a great convenience to users of Bucyrus shovels.

There are good openings for parties having means, who may wish to engage in coal stripping, which is a very profitable business in the Pittsburg district. We know of several good fields of strip coal that may be secured either by lease or purchase. We also know parties owning land, who are looking for parties with means to join them in the coal stripping business. The cost of a plant including steam shovel, cars, track, locomotive, tipple with shaking screens, pumps, pipe, etc., will vary from $30,000.00 to $50,000.00, part of which may be purchased on several months time. Communications may be addressed to the Pittsburg Machinery Company, care of Stilwell hotel, Pittsburg, Kansas.

Kentucky

Henderson—The Ohio Valley Contract Company, of this city, has been awarded contract by the War department for dredging the channel of the Ohio river between Henderson, Ky., and Caseyville, Ky. Several dredges will be put to work at once.

Johnson & Briggs, contractors, who have a contract on the L. & N. described in this number, were recently fortunate in striking a well which is furnishing 50,000 gallons of water a day without appreciable dimunition of the supply.

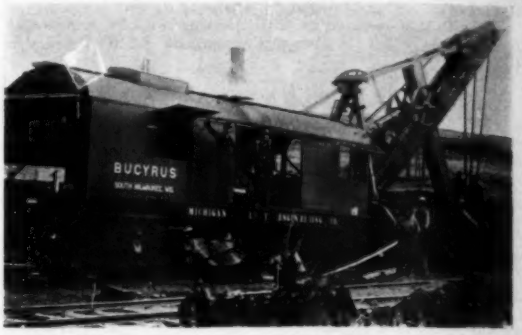
Massachussetts

Boston—It is stated that work is to be resumed on the Southern New England Railroad, a Grand Trunk line. Within the last year all construction on this line was stopped, owing, as was stated by the daily papers, to an agreement with the New York, New Haven & Hartford R. R. not to finish this new road. It is now reported that owing to a change in the management of the New Haven road, the Grand Trunk line is to be completed to Providence, R. I., and the contractor, Mr. John Marsch, who had the contract for the work and who is now suing for $1,500,000 for breach of contract, has been ordered to resume work on his contract. If the report is true, this will be pleasant news to the New England business men.

This is not the first rumor that has arisen in regard to the resumption of this work.

Michigan

Rickland—James W. Cash has recently set up a 70-C Bucyrus shovel for the Michigan Railway Engineeirng Company, in a gravel pit here. Mr. Cash is running the machine with Lou H. Gaynon craning, and Walter J. Cash his son, firing. Mr. Cash advises that the shovel is doing good work and the accompanying photograph illustrates it starting the first cut.



Kalamazoo—J. E. Davis of Hartford, Michigan is in charge of the steam dredge "Kalamazoo". Thos. Senson is again with Weston Bailey as fireman and Roy Belden, cranesman. The boys are located at the National hotel 606 E. Main Would like some prices on dipper teeth in the near future. City engineer, Andrew Lindrick, has the work in charge.

Rockland—Stalker and Co. have a sub-contract under J. H. Flick Construction Company of Chicago, to fill a tressel for the Chicago, Milwaukee & St. Paul Railroad near here. The material, which amounts to somewhat over 10,000 yards is taken from a borrow pit near Pori and is hauled 11½ miles to Rockland. They are using a Bucyrus shovel and Western dump cars.

Minnesota

Crookston—County ditch No. 88, which is to be let on September 10, will consist of a main ditch and four branches. Main ditch will be 5.6 miles long, bottom width 4 and 6 feet, depth 4 to 7 feet, requiring excavation of 58,190 cubic yards. Branches 1, 2 and 3 are each about 1½ miles long, with 4 feet bottom, 4 to 7 feet deep, containing 17,496, 11,532 and 11,994 cubic yards, respectively. Branch No. 4 is one mile long, 3 feet wide at bottom, 1.3 to 5.5 feet deep, containing 5,824 cubic yards. Slopes on all ditches are 1 to 1; the excavation is estimated at 12c, and the leveling of road at $844. Johannes E. Beim, of Crookston, is the engineer.

Duluth—Contract for constructing new line for Duluth & Iron Range Railroad from mile 108 to Burnside Lake, Minn., was awarded to Charles Magnuson, Duluth, at $50,000.

Mississippi

Lakeview—Illinois Central Railroad has awarded contract to Roper Brothers, Memphis, Tenn., for grading for second track between Lakeview and Lake Cormorsent, Miss., about eight miles.

Missouri

Shelbyville—The Shelby Northwestern Railway Company has profiles prepared and will soon let some nice team work on its line between Shelbyville and Novelty, Mo.

Montana

Three Forks—Some time ago the report went out that the proposed new railroad from Three Forks to Radersburg, Mont., tapping a rich district in Broadwater county, would not be started this year. Now, however, comes authentic news that there is every reason to believe work will start on the new road this fall.

New York

Seneca Falls—H. C. Benjamin is running a class 14 dragline excavator for J. F. Dolan here. He states he is moving about 1,100 yards bank measurement in a day. The material is marle which is as hard as shale rock and considerably heavier.

Utica—New York Central & Hudson River R. R. is considering making improvements to cost about $2,000,000 at Utica, N. Y., and vicinity. The work will include double-tracking the old Black River R. R., now the St. Lawrence division, between Stittville and Carthage; laying a fifth track between Utica and Rome with passenger and freight facilities; relocating of freight tracks and elevation of the Black river tracks in such a manner that the Black river trains will cross above the freight tracks. G. W. Kittredge, New York, is chief engineer.

New York—James H. Boyd formerly superintendent of steam shovels for Winston and Company, at the Ashokan Dam, Brown Station New York, is now with the Alpha Portland Cement Company, Easton, Pennsylvania.

Martin Kane is with Frazier Brace and Co., in Canada. We regret to learn that he recently slipped and broke his wrist, but we understand that he has practically recovered from his injury.

North Carolina

Shelby—Four contracting firms submitted bids July 21st on dredging Buffalo creek and three tributaries, requiring excavation of 922,328 cubic yards, the lowest bid being that of Thompson & Moseley, Greensboro, N. C., at 7.2 cents per cubic yard. Contract has not been awarded and it is possible that the commissioners will purchase machinery and do the work. W. L. Damron, secretary.

Cheraw—The proposed Pee Dee Valley Railroad is expected to award contracts in a few days for projected line from Kollock, S. C., to Rockingham, N. C., about twenty-one miles. W. L. Gilliespie, Cheraw, C. S., chief engineer.

Oklahoma

Muskogee—Cheyenne Short Line Railroad has awarded contract to Levy & Levy, Muskogee, Okla., for construction of line from Strong City, Olka., on the Clinton & Oklahlma Western Railroad south to Cheyenne, 77 miles. R. G. Alexander is president and chief engineer, Norman, Okla.

Ardmore—Contract has been awarded to William Kenefick Construction Company, Kansas City, Mo., by Oklahoma, New Mexico & Pacific Railroad, for construction of its line west out of Ardmore, Okla.

Oregon

California-Oregon & Eastern Railway, recently incorporated, is preparing to commence work on an 85 mile line in southern Oregon and northern California.

Panama

The grand total of canal excavation to July 1, was 203,383,539 cubic yards, leaving to be excavated 14,812,034 cubic yards.

The total excavation for the month of June was 2,659,424 cubic yards, as compared with 2,339,770 cubic yards for the corresponding month last year, and 2,646, 442 cubic yards in June, 1911.

The dry excavation for the month amounted to 1,152,299 cubic yards, entirely by steam shovels. The dredges removed 1,507,125 cubic yards, nearly attaining the total of the previous month, 1,525,493 cubic yards, which was the highest of record on the canal.

Pennsylvania

Mahanony City—P. F. Donahue is foreman for the Philadelphia, Reading Coal & Iron Company at Ellangowan Colliery. They are operating a 70 ton Bucyrus shovel here.

Mahanony City—Ed. F. Carey is operating a 70 ton Bucyrus shovel at Ellangowan Colliery stripping for the P. & R. C. & I. Company. Joe Henneger is craning.

Shenandoah—Clarence Reeves is operating a model 60 Marion shovel for the P. & R. C. & I. Co. at Gilberton.

Shamokin—J. C. Landefeld is foreman for the Philadelphia & Reading Coal & Iron Company at Bear Valley, stripping. Mr. Landefeld formerly ran a shovel and hopes in the spring to go into contracting for himself.

Shamokin—G. J. Jones is craning a 70 ton Bucyrus shovel at Bear Valley stripping. He states that his shovel "is one of the best climbers" in these parts. It has been in rock for eight months, and they have not found it necessary to use explosives.

New Milford—Floyd Tiffany is craning a 70 ton Bucyrus shovel for P. McManus, at Alford, Penn. His address is the Walker hotel, New Milford, Pa.

Wilkes-Barre—Wilkes-Barre Contracting Co., has awarded contract to Porter Bros., Portland, Ore., for construction of its proposed railroad. The line will connect the Delaware & Hudson Co. and the Pennsylvania Railroad Co.

Oil City—Pennsylvania Railroad has awarded contract to Thomas F. Reilly, Philadelphia, for grading, masonry and track laying of nine miles of single track, change of line and grade of Pioneer branch on Buffalo division from Pioneer to Oil City.

Tennessee

Chapel Hill—John H. Doke is running a Bucyrus shovel for T. Towles & Company.

Texas

It is stated that Missouri, Kansas & Texas Railroad will construct a 12 mile line from Hillsboro to Whitney connecting with its main line to the northwest, make traffic arrangements with Trinity and Brazos Valley from Hillsboro to Teague, build some 65 miles from Teague to Trinity, connecting with what is known as the "Orphan Branch", a 60 mile stretch owned by the Katy.

The Gulf, Freeport & Southern Railway expects to have survey and other preliminary work connected with its proposed line finished about August 15. Road will run from Freeport to Sealy, Tex., about 100 miles. It will connect at Sealy with the Missouri, Kansas & Texas Railway and the Atchison, Topeka & Santa Fe Railway.

Henderson—Timpson & Henderson Railway is considering extension of its line from Henderson, Tex., west via Tyler to Kaufman, Tex., about 100 miles. The company now operates line from Timpson to Henderson, 34 miles.

Utah

Notes from Salt Lake City and Vicinity

By H. N. Steinbarger

The Utah Railway known as the "Coal Road" has recently been absorbed by the D. & R. G. Ry. and part of the line which was to have been built has been abandoned, as it paralleled the D. & R. G. tracks for many miles. The object of the road was to reach the Utah coal fields and secure a more direct outlet into Salt Lake City. Instead of following the Utah Railway survey, a double track will be constructed from Thistle, Utah to Salt Lake City. It is reported that the Utah Construction Co. of Ogden has the general contract for the double track work.

They also have the Utah Railway general contract and have a considerable part of the line covered by sub-contracts. Among the sub-contractors now working are:—D. S. Gerow, Denver with two Bucyrus shovels; T. R.Wattis Co., Salt Lake City with one Marion shovel; Young & Crook of Denver, with one Bucyrus shovel; W. W. Brown, Salt Lake City with one 40-C Bucyrus shovel; Reynolds-Ely Construction Co., Springfield, Utah with one 60-C Bucyrus shovel. All above have full equipment of Vulcan locomotives and Western cars except the last named who are using Kilbourne-Jacobs cars. Others on the "Coal Road" work are Eggleston & Mathews of Denver and J. A. Thorn of Springfield, Utah. All are located on the unfinished portion from the coal fields to Helper, Utah, where the "Coal Road" cuts in to the D. & R. G. Ry.

T. R. Wattis Co., of Salt Lake City, Utah, recently took a contract to build 5 miles of standard gauge road for the Standard Coal Co., of Salt Lake City. The line is located about eight miles from Helper, Utah and will connect their mines with the D. & R. G. Ry. Wattis made a record in getting on to the job, moving a mile and a half across country with a model 20 Marion shovel, Vulcan dinkies and Western cars and throwing dirt in one week. This is going some considering the fact that it was accomplished n the heart of the Rocky Mountains.

D. S. Gerow and B H. Harris dropped into Salt Lake City during August just to look the town over. Incidentally they bought some supplies for their camp located near Helper, Utah. It was the first trip either has made into the big town for about three months. We guess the bright lights were too much for they remained only a day and a half.

By the way, the Engineers base ball club of Helper & vicinity have been cleaning up all teams in the surrounding territory lately. Paul Wigton engineer with D. S. Gerow and young Griffin of Dooling Bros. camp are the pitcher and catcher respectfully, some battery those boys! If they could have good support all of the time nothing could get away from them. Some of the engineers on the team don't always play ball as well as they can survey and locate a railroad. Anyway we admire their nerve and pluck.

A number of contractors along the line of the D. & R. G. Ry. Soldiers Summit detour line have completed their allotment of work. Among those ready to move to new fields are: Hamilton & Gleason of Denver; Reynolds-Ely Construction Co., Springfield, Utah, T. R. Wattis Co., Salt Lake City; B. H. Davis Company, Los Angeles California; Dooling Bros., Denver and Kansas City. —All steam shovel outfits. Boyer Bros. and Pat Fitzgerald with grading outfits have completed their work.

G. H. Hutchison district manager of N. B. Livermore Co. at Los Angeles, F. G. Conelly of Billings, Montana representing the Austin Manufacturing Co., Harvey Illinois and H. N. Steinbarger of Denver representing Bucyrus Co. and others lines were recently in Salt Lake City at Hotel Utah. It is understood that all held quite a reception—sort of a continuous performance at the Utah.

Various contractors in the Soldiers Summit, Coal Road and Interurban Electric Ry. work arriving at various times—"some strenous" this reception business when they come in relays. That is strenuous for the receiving line.—The "not at home sign" is never used so the result can be surmised.

The Interurban Railway backed by W. C. Orem & Co. of Salt Lake City is well under way. The line will connect Salt Lake City with all towns along the line of the D. & R. G. to Provo, Utah. The line will be electric and frequent car service will mean much to the towns as well as the farmers in the district. It is estimated that large quantities of fruit will be shipped annually as it will interest one of the best peach, apple, pear and melon section of the country.

Only one steam shovel cut was encountered and this we are informed has been covered by the Utah Construction Co.

The line will be in operation by fall if plans are carried forward.

Henry Heiser of Dooling Bros. camp dropped into Salt Lake City recently for a few days stay.

His was some very important mission but he kept his plans and movements pretty much to himself—very mysterious.

Wisconsin

Burlington—Brumm, Chapman & Herman are operating a class 9½ Bucyrus dragline excavator mounted on caterpillars on their contract three miles from here. Their work comprises the excavation of about 168,000 yards of main and lateral ditches for the Husier drainage district. The proposition is particularly interesting as the machine is being operated over very soft marshland and the caterpillar device is having a very hard, and so far an extremely satisfactory trial.

Milwaukee—The Chicago, Milwaukee & St. Paul Railway has requested the Wisconsin railway commission for another extension of time to complete its track elevation on the south side, Milwaukee, Wis. According to report, the railroad's reason for the delay is that the tightness of the money market makes it impractical to finance the work now. The elevation project involves several million dollars.

Fontana—Fred C. Simmonds and Len Hoeft are operating a Bucyrus shovel for the American Sand & Gravel Company at this place.

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1 ATLANTIC 90 TON
*2 MARION 90 TON
2 MARION MODEL 60
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3 ATLANTIC 70 TON
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4 55 Ton 18x24 TEN WHEEL
5 65 Ton 20x24 CONSOLIDATION
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*1 13x18 PORTER, STANDARD GAUGE
*1 14x22 AMERICAN, " "
*1 16x24 PORTER, " "
*3 16x24 AMERICAN, " "

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*Built in 1912.

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1 Giant D 50-Ton Vulcan Shovel.

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1 MODEL 30 OHIO STEAM SHOVEL—1-yd. dipper, working weight 38 tons, in service 1½ years, is in good condition.

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Care Excavating Engineer P. O. Box 607, Milwaukee, Wis.

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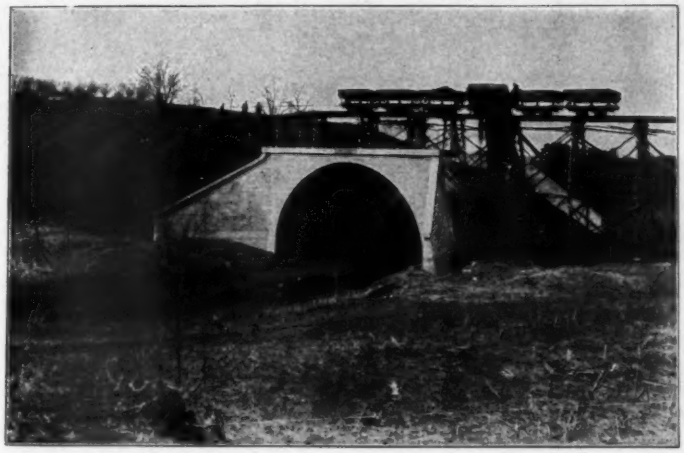
There Is No Uncertainty About Getting the BEST When You Buy

The Western Dump Car



Western Equipment Is The BEST The World Produces

No time or expense is spared in making the Western Dump Car the standard of perfection. The exclusive features found only in Western Dump Cars put them in a class by themselves.

Care in manufacturing increases the life of Dump Cars, increases profit by decreasing the cost of maintenance and repairs.

If you want continuous service at a minimum cost, get Western Dump Cars. They stay on the job day after day. Cars that are inadequate and always breaking down make your operating costs run high and reduce your profits.

BUY

Western Earth and Stone Handling Machinery

and you will always be sure to get the BEST.

Western Wheeled Scraper Company

AURORA, - ILLINOIS

A Positive Necessity

In order to obtain maximum efficiency from your machinery, it is imperative that it be covered with a good, protective coating that will be effectively weather proof and vibration proof.

Years of experience and an accurate and scientific knowledge of the demands made upon such a coating is required for a product that will embrace these specifications.

For sixty-two years we have been making good paint and this experience coupled with the largest and most scientifically equipped paint factory in the world enables us to produce as nearly a perfect paint as is possible.

Our chemists will be glad to help you solve any coating problems that you may have.

Heath & Milligan Mfg. Co.

Paint and Color Makers

CHICAGO, :: U. S. A.

Cleaning Up the Debris at Dayton, Ohio.

Troy, Ohio, April 28, 1913

If the flood hit you, you need TROY Dump Wagons to dig you out. You can't wait on the other fellows to clean out for you. Get dump wagons and do your own work.

The Dayton Relief Committee, headed by John H. Patterson, President of the National Cash Register Company, bought 75 TROYS. Manufacturers and business houses all through the flooded district are ordering TROYS by wire or letter to help them haul away the muck and wreckage.

1½ yard Troy Bottom Dump Wagon $117.50
2 yard Troy Bottom Dump Wagon 122,50
Brake $9.50 extra. F.O.B. Troy. Prompt Shipmemt.

If you aren't in the mud, get a TROY and help dig your friends out. You will never regret the investment --you can always find use for a Dump wagon.

You can get better Dump Wagons from Troy than any place else--and get them quicker. Write or wire us.

Very truly yours,

THE TROY WAGON WORKS CO.
North Plum St.,
Troy, Ohio.

A Relief Station at Dayton, Ohio.

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WIRE ROPE

The wires in Roebling Wire Rope are rolled and drawn from carefully selected metals and are shown by thorough tests to be strong, pliable and uniform in quality. These wires are stranded into rope in accordance with designs and shop methods developed from the experience of many years.

John A. Roebling's Sons Co.

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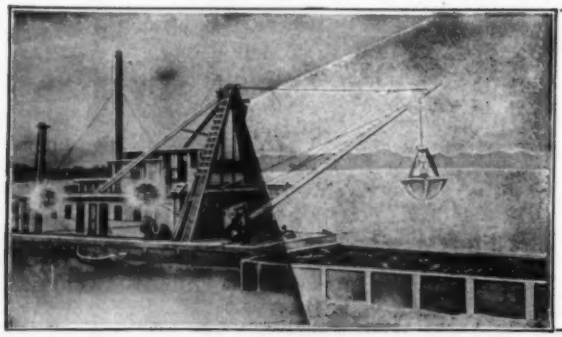

Are you watching the LIGHTING *cost and efficiency of your dredges?*

MILBURN LIGHTS

Will save you money.

Ask for catalog.

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Reinforced Concrete Engineers
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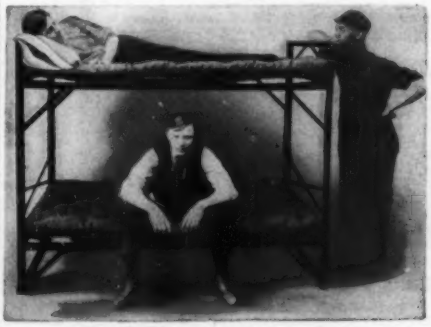
Contractors' Supplies

1323-4-5 Rialto Bldg. Kansas City, Mo.



YOUR MEN NEED REST

If men sleep in clean, sanitary bunks where they rest comfortably and are never bothered by bugs—they are in better condition for a hard day's work, aren't they? Contractors, think this over.

"TIGER" STEEL BUNKS

are a real investment for the contractor. They never break down, like a wooden cot. Need no packing for shipping, and even if shipped from camp to camp in cars with other equipment, there is no danger of injury. Are absolutely bug-proof. The spring fabric, though elastic, can never sag. The complete bunk is coated with rust proof black enamel. All sizes, either double or single deck. *Write for descriptive circular and prices.*

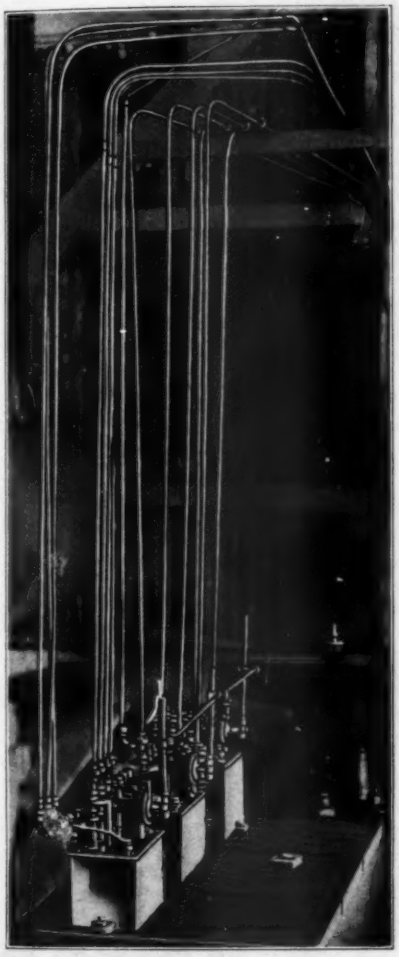
HAGGARD & MARCUSSON CO., 1113 West 37th St., Chicago, U.S.A.

AGENCIES:—Brodt-Ink & Bascom Loggers' Supply Co., Seattle, Wash. Stewart Bros. Co., Portland, Ore. Western Equipment Co., San Francisco, Cal. Clapp, Norstrom & Riley, Chicago, Ill. and St. Paul, Minn.

Force Feed Lubricating Pumps

Supplying Fourteen Steam Cylinders

The Three Pumps Shown Driven From One Shaft



REDUCE OIL BILLS
and Wear and Tear of
Valves and Cylinders

We have them in operation with seventy feeds from one reservoir. Some prefer to have them connected as shown in the cut.

HILLS-McCANNA COMPANY

154 W. Kinzie Street CHICAGO, ILLINOIS

AGENTS—JAMES D. SCRUGGS, 22-20th STREET, BIRMINGHAM, ALA.

Southern Representatives—Hall Manufacturing Co., 94 John St., New York City
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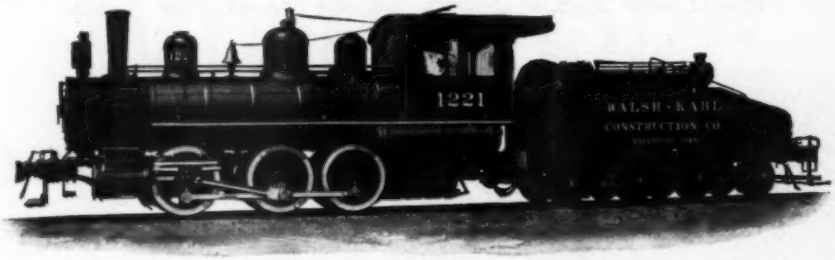
ON STEAM SHOVEL WORK

it is as important to have the best locomotives as it is to have good cars and shovels.
This is why there is such a demand for

DAVENPORT LOCOMOTIVES



This illustration shows our 17x24, 47 ton 6-wheel connected locomotive with separate tender that we recommend for 12-yard service. We equip these locomotives either with or without the air-dumping arrangement, as desired.

Our engines have large free steaming boilers built to pass any inspection specified.

Several sizes carried in stock for immediate shipment. If interested in locomotives, ask for our catalogue.

BRANCH OFFICES

Chicago, 12 & 14 So. Canal St.
St. Paul, 1308 Pioneer Bldg.
St. Louis, 654 Pierce Bldg.
New Orleans, 208 Godchaux Bldg.
New York City, 362, 50 Church St.
Seattle, 617 Western Ave.
Pittsburgh, 405 Oliver Bldg.
Montreal, 286 St. James St.
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Vancouver, 175 Cordova St.

DAVENPORT LOCOMOTIVE WORKS, Davenport, Iowa

MONARCH
"Whyte" Strand
WIRE ROPE
is perfection in rope manufacture

Made in our own factory, from rod to finished rope, tested for extreme strength and ductility, and guaranteed to be the best.

Will you try it?

M·O·N·A·R·C·H
W·I·R·E—R·O·P·E
ALWAYS ONE WHYTE STRAND
TRADE MARK REGISTERED.

MACOMBER & WHYTE ROPE COMPANY
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ASK THE MAN ON THE JOB
WHAT HE THINKS OF THE
Jordan Spreader

All Steel Construction

Pneumatic Control

Operated by One Man

Jordan Spreader Operated by Walsh-Hogan Construction Co., at Forbes, Minn.

Designed by a Railroad Road Master

The Result of 28 Years of Specialization

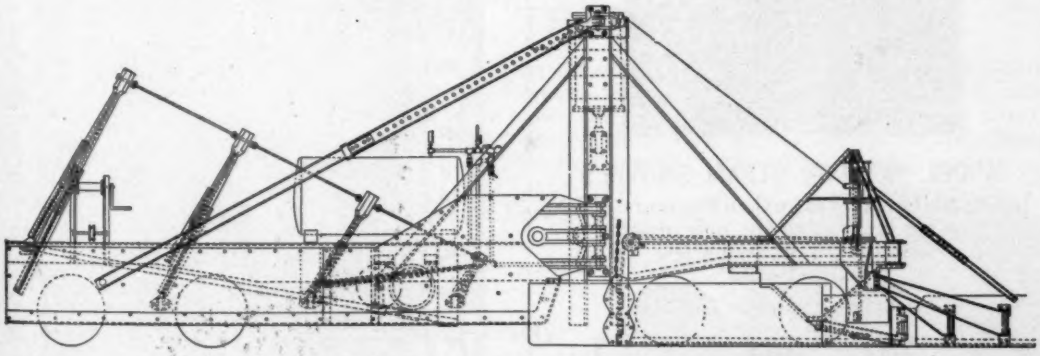
¶ Will spread as much material as 2500 laborers, at an expense of $30.00 to $35.00 a day.

¶ It spreads to 45 feet in width, cuts a grade to 24 inches below and to 17½ inches above top of rails.

Built in 80,000 to 100,000 pounds capacities.

¶ Easily operated by one man. Adjusted by pneumatic control.

¶ Adapted for use as a snow plow, ballast plow, flanger, scraper, bank builder and spreader. Write for catalog.



The O. F. Jordan Co., *McCormick Bldg.*, Chicago

Known the World Over

The Only Water-tight Leather Sole Rubber Footwear Made

Here Is the Reason

Here Is Proof:

Rubberhide Company,
Essex Bldg.,
Boston, Mass.
Gentlemen:—

Replying to your letter of April 9th in regard to our using your rubber boots, would state that we believe your boots to be away the best to be found in the market, and we are using them to the exclusion of all other boots.

Yours truly,
(Signed) Name On Request.

A 25% MORE-WEAR FEATURE

All Rubberhide Boots and Ezoa Shoes have malleable iron heel rims. No extra charge.

RUBBERHIDE Economy Begins Where Ordinary Rubber Boots Wear Out

Write for Catalog and Prices

Rubberhide Company, Desk E.E. Boston, Mass.

Insure Yourself

against injury to your employes engaged in heavy construction operations, such as:

RAILROAD CONSTRUCTION
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Within Five Minutes of All Head Underwriters.

Hill's Rail Clamp

AUTOMATIC IN ACTION

MODEL "K" FOR STEAM SHOVELS

has stood the test of more than five years. Not one has broken and the only repairs necessary have been a few "Grip Points"

Prices and Printed Matter On Application.

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QUALITY ENGRAVINGS

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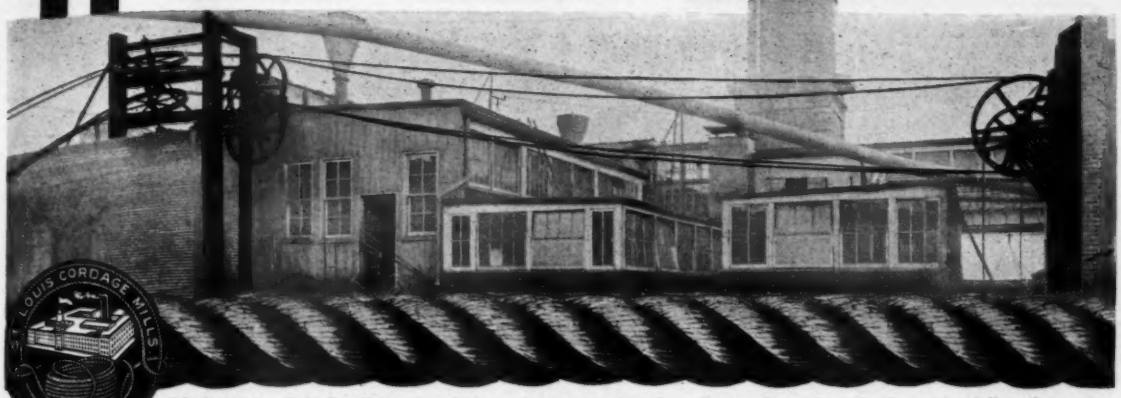
See This Drive?



Right-Angle Drive. Trojan Rope Drives run out-doors, around corners, over obstructions—almost any distance, in any direction; and they *deliver the power.*

¶ This drive runs 440 feet in the open—right out where the sun, rain and snow beat down on it day and night, 365 days in the year.

¶ For over seven years under these hard test conditions this same piece of Trojan Transmission Rope has been delivering 50 horse power from one factory building, across the alley to another. During all that time it has not once required mending or lubricating—it carries its own lubricant. Now, this is offered as an example—it is no record breaker so far as Trojan is concerned—it is not an isolated case. Trojan Transmission is built to give just this kind of service.

TROJAN TRANSMISSION

—indoors, outdoors, in all kinds of weather and under all tests wears best—lasts longest—and gives the maximum of power efficiency every day it is in use. Made of the best selected Manila hemp—only. Treated with our special preservative compound. Inspected for defects—tested for tensile strength—core treated with lubricant which works its way throughout the entire rope—every fibre. Requires no other lubrication during its whole life.

More About Trojan in Our Free Book

¶ "Trojan Transmission" which treats untechnically of Rope Transmission and Trojan. Write us fully about your problems—for prices, information, anything that will help—we'll answer freely.

We Ship Without Delay—
On Telegram if Necessary

St. Louis Cordage Mills,

Dept. EE St. Louis, Mo.

Meisenheimer Printing Co.

ENGRAVERS PRINTERS
LITHOGRAPHERS
BINDERS

330 Clinton St. Milwaukee, Wis.

Study This Clay Handling Proposition

THE plant illustrated below is a larger producer of shale paving brick in which all the raw material from the quarry to the storage bins is handled on "S-A" Belt Conveyors. This system of conveyors replaced an old car haul and saved half the expense of handling raw material. Material is delivered by the steam shovel in the quarry to a hopper feeding a belt conveyor. From here it is conveyed 344 feet across the river on an inclined conveyor 144 feet centers into the plant. Two other conveyors, equipped with automatic trippers distribute into the storage bins. "S-A" Conveyors save not only by virtue of their lower costs per ton moved, but their ***regularity*** increases the plant and quarry efficiency. The storage also renders the plant independent of shut-downs in the quarry.

Our engineering board is at your service in studying your conveying problems. WRITE.

Stephens-Adamson Mfg. Co.

200 Ridgeway Ave.
AURORA, - ILL.

New York Chicago
Pittsburgh St. Louis
Los Angeles Boston

LIGHT INDUSTRIAL LOCOMOTIVES

require as much care in their design and canstruction as do heavy engines; and the conditions under which they operate are frequently quite as exacting.

The illustration shows a three-feet gauge locomotive, which weighs 28500 pounds and is operating on curves of 16 feet radius. This type is specially suitable for light switching service, where conditions permit steam locomotives to be used.

Four-coupled tank locomotive, Standard Oil Co.

The Baldwin Locomotive Works

PHILADELPHIA, PA., U. S. A.

BRANCH OFFICES

NEW YORK, N. Y., 60 Church Street ST. LOUIS, MO., Wright Building CHICAGO, ILL., Railway Exchange
PORTLAND, ORE., Spalding Building RICHMOND, VA., Travelers Building

TAYLOR MESABA

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Taylor-Mesaba Hoisting Chain

⅞" 1" 1⅛" 1¼" 1⅜" 1½"

S. G. Taylor Chain Co.

641 Marquette Bldg. Chicago, Ill.

Found at Last

The Perfect Steam Shovel Chain

"HERCULES SOLID WELD"

Every Link as Strong as the Solid Bar

Cannot come apart at welds. Made from tough high grade hammered iron. The chain that lasts until entirely worn out. No delays from broken chain.

It is a marvel in rock work

Made only by

THE COLUMBUS CHAIN COMPANY

Lebanon, Pa. Columbus, Ohio

Address all communications to COLUMBUS, OHIO

208 locomotives have been in operation on the Panama Canal. Of these, 168, or 81 per cent, were furnished by the American Locomotive Company.

From May 4th, 1905, when work was started by the United States Government, to April 1st, 1913, 121,152,783 cubic yards of material or "spoil" have been hauled from various cuts on the Panama Canal to dump.

Of this enormous amount approximately 100,000,000 cubic yards or 82½ per cent have been hauled by locomotives built by the

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET, NEW YORK

One of the 168 locomotives, built by the American Locomotive Co., at work in Culebra Cut, Canal Zone, in February, 1913